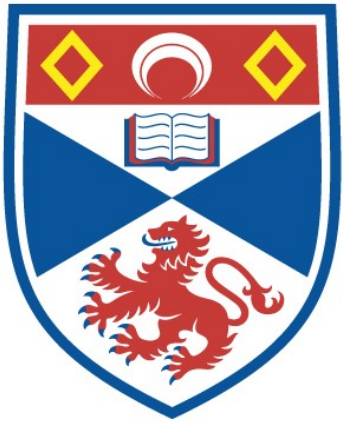
ESSAYS IN ISLAMIC FINANCE AND BANKING

Sara Al Balooshi

A Thesis Submitted for the Degree of PhD
at the
University of St Andrews



2020

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University of
St Andrews

This thesis is submitted in partial fulfilment for the degree of
Doctor of Philosophy (PhD)
at the University of St Andrews

November 2019

Abstract

This thesis comprises three essays on Islamic investment securities (sukuk) and Islamic banking products. Data show that firms in dual financial system economies utilize traditional and Islamic instruments simultaneously to raise funds. Hence, religion is not the sole motive for Islamic transactions. That is attributed to the structure of sukuk, either promoting transparency or obscuring firm information. Chapter II investigates the relationship between firms' opacity and the choice to issue sukuk, given the availability of traditional external sources. We find that as opacity increases, the probability of firms' issuing zero-coupon (ZC) sukuk is the highest followed by conventional bonds and profit-loss sharing (PLS) sukuk. Therefore, opacity has a significant role in choosing between traditional and Islamic instruments, and that issuing zero-coupon sukuk requires more supervision. Chapter III uses a modified pecking order theory to place sukuk in firms' financial hierarchies among debt and equity. We look at the firms' funding choices at two thresholds: exhaustion of internal funds and maximum debt capacity. Firms' choice indicates the level of adverse selection and information asymmetry involved in issuing sukuk. When internal funds are exhausted, firms prefer to issue Profit-loss sharing sukuk over bonds, and fixed income sukuk is placed before equity beyond firms' maximum leverage. Thus, sukuk can widen the external funding spectrum and the modified pecking order can accommodate sukuk. Chapter IV looks at the investors of such instruments. We investigate the Islamic banks' product mix to verify the claim that Islamic banks are identical to conventional banks due to the concentration of debt-like products. We hand-collected the values of each Islamic banking product otherwise aggregated under "loans". We document that while debt-like products positively affect bank performance, Profit-loss sharing products enhance solvency. Contrary to theoretical claims, Islamic banks portfolios are not concentrated. Chapter I introduces Islamic finance and products, while Chapter V concludes.

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Acknowledgements

I was in the third year of my Bachelor's degree when I attended a class on Islamic banking and finance for the first time in my life. It was different but exciting, lead by the expertise of Prof. Jassim AlAjmi, to whom I indebt my interest in the field. Later, in 2013, Dr Geethanjali Selvaretnam supported me when I choose my Master's dissertation to be on Islamic banking, where my path in academia has begun. The past three and a half years are a milestone in my academic journey. The journey could have been harder without Allah's blessings, and the love and help of many people around me.

First and foremost, I would like to express my gratitude to my supervisors, Dr Maria Chiara Iannino, Dr Pejman Abedifar, and Dr Vivek Prasad. I consider myself extremely lucky to have been supervised by such a collection of expertise. Their knowledge, patient and dedication improved my research and my personality as a researcher.

I want to extend my sincere thanks to Professor Mehmet Asutay, my external examiner and Professor Gavin Reid, my internal examiner. Their insightful propositions and feedback are significant to produce this version of the thesis.

I would like to express my deepest gratitude to my parents for their unconditional love, care and support that provides me with the strength throughout the journey. My heartfelt appreciation goes to my husband, my partner, Abdulla, who believed in me and was there every step on the way. I would like to especially thank my siblings, Noor, Mohmmed, Hanan, and Yousif for the never-ending support. Salwa Bahar is a second mother for me all along, and Hameed AlBalooshi has a lot to do with where I am today.

Dina, I can never thank you enough for the lifelong sisterhood. Asoom, you, me and Newcastle, we made unforgettable memories. Sara and Abrar, thank you, and I promise, we can make up for everything. Special thanks to my St Andrews friends: Nayha, I will keep telling you, you are a blessing and the kindest Economist I have ever known. Tiran, a true friend and a pure heart. Viola, our dinner plans were always de-stressing. Estrella, Nikolay, Zibho, Sinan Johan, Tini, and Aysha; thank you.

I owe a great debt to the University of Bahrain for the financial support. I am very enthusiastic about coming back and sharing academic and personal experiences. I also want to thank the faculty of the School of Economics and Finance in St Andrews, especially; Prof Miguel Costa-Gomes and Dr Ozge Senay for endless support and guidance. I would also thank Mrs Angela Hodge, Mrs Caroline Moore, Ms Laura Newman, Ms Liz Pert-Davies, and Mr Andrei Artimof.

Maryam, Ebrahim, Isa, Ali and Ahlam, I know your prayers were with me, may your souls rest in peace.

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Chapter I.

Introduction

Religion, economic structure and legal environment are strongly correlated (Hilary and Hui, 2009). That is especially true in many developing and emerging economies. Hence, the emergence of religion-based financial systems is inherently expected. A prominent example is Islamic banking and finance, where Muslims in the Middle East formally institutionalized its practices in the early 1970s when they incorporated the 1400-year old Islamic teachings into actual financial modes. The goal was initially to provide financial services that are religiously acceptable. Currently, Islamic banking and finance is an integral part of the financial systems in more than 53 developing countries. It also made its presence in Muslim-minority countries such as Sri Lanka, Thailand, Luxembourg, Ireland and the UK. The total system assets were worth more than USD 2 trillion in 2018. Twenty years ago, the question was whether Islamic banking and finance is a phenomenon or it is going to survive. Today, there are even more questions about how it succeeded and why. In this thesis, we highlight contemporary issues in Islamic corporate finance and banking by verifying the link between the principles of Islamic finance and industry practice.

Beyond spiritual rituals and day-to-day activities, Islamic principles – collectively called Sharia[1] – dictate guidelines to govern financial and business conducts. It explicitly prohibits the creation of debt and encourages asset-backed financial intermediation. It restrains charging interest because it economically harms the weakest party (the borrower). In addition, speculation, high uncertainty levels and transactions with no or weak connection to the real economy are also forbidden. Sharia prohibits the trading of alcohol, pornography and gambling because they are considered to be hazardous to humans and the community.[2] Advocates of the system argue that the prohibitions are possible remedies for problems caused by financial liberalization.[3] That is, bringing back values to the financial system and the economy motivates social responsibility and public mortality, which enhances the living environment and promotes economic growth. It also emphasizes on the hard work and responsible venture rather than commoditizing all financial and business pursuits.

[1] The combination of the verses of the Quran and the teachings from the sayings and actions of Prophet Mohammed.

[2] A detailed overview of Islamic finance is provided in section I.

[3] Financial market growth is associated with more speculative activities that can destabilize the economy. That is, more risky behaviour leads to over-leveraged positions and asset prices bubbles, increasing default probabilities and overall economic meltdowns. That is especially true when combined with deregulation or financial liberalization (Minsky et al., 1982; Singh, 1997; Stiglitz, 2000).

One can think about Islamic principles as a faith-based regulating scheme. The literature establishes that religion adds a moral dimension to economics (Zinbarg, 2005) because it is conceivably an "internal moral enforcement mechanism" (Hilary and Hui, 2009; Torgler, 2006). Specifically, the assumption that the economy is atheist and religion leads to irrational decisions has been debated, and is still questioned (Iannaccone, 1998); considering that devoting all efforts and resources to achieve profit or utility maximization leads to materializing all aspects of the market place, including participants. That eventually fail to consider economic justice in the economic efficiency formula.

For example, interest-bearing loans, which are prohibited in Islamic finance, are indeed profitable for banks. Nevertheless, they have not been rewarding in socio-economic terms as proven by (almost) all financial and economic crises. The literature agrees that a common cause of the Greek debt crisis, the global subprime meltdown, the Asian 1997 crisis, and the Great Depression is the mix of the credit bubble and speculation (Acharya and Richardson, 2009; Demyanyk and Van Hemert, 2009; Keys et al., 2010; Peshkoff and Bichisao, 2012; Wade, 1998). The main problem with debt is its price (Mills and Presley, 1999), considering that the interest rate charged by the lender does not reflect the transaction's realized gains. Simply put, the lender is placing a price tag on the amount lent without considering the borrower's investment intentions. That is to say; the lender is indifferent whether the borrower gambles or start a venture. Hence, the accessibility to debt encourages speculative borrowing and lending activities and consequently creates asset pricing bubbles. Moreover, Minsky et al. (1982) assert that by issuing liability to fund new investment, one is pledging uncertain future cash flows to service debts, where profitability is usually unrealistically conditioned upon interest rates being consistently lower profits, therefore propagating speculative finance. They argue that a sound financial system is mutated into a vulnerable one when excessive debt is introduced.

In light of the above, some scholars (Ahmed et al., 2013; Asutay, 2012; Clement and Wilson, 2004; El-Gamal, 2000; Warde, 2000) view the Islamic financial system as a diversification opportunity with the potential to support the traditional financing techniques. Other scholars (Khan, 2010; Kuran, 2004; Nomani, 2006) believe that practitioners added a religious label to the mainstream financial system to attract the funds of believers. Earlier Islamic banking and finance literature is centred on the analysis of Islamic scripture and examining whether an actual application of such guidelines is feasible (Chapra et al., 2008; Dusuki and Abozaid, 2007). Today, after more than 25 years of formal operating, the empirical evaluation of the system gains greater attention to verify earlier narrative-based inferences.

In this thesis, we capitalize on the availability and the enhanced quality of data to provide an empirical link between Islamic principles and the "real" world practices. Our objective is to evaluate the implementation of Islamic principles empirically. We target contemporary issues in Islamic corporate finance and banking in dual financial system economies. Also, we concentrate on the various types of investment certificates and authentic funding facilities Islamic banking and finance offers. In particular, Chapters II and III examine the issuance of corporate Islamic investment securities (sukuk). Chapter IV, analyses the Islamic banks' product portfolios. Countries such as Malaysia, Qatar and Bahrain accommodate the conventional and

Islamic financial systems (dual-financial systems), where firms and individuals have access to both channels with no restrictions. Our thesis emphasizes that the two systems are complements rather than rivals or substitutes. We show that it is possible to use conventional corporate capital structure theories to understand sukuk and that religion is not the only motive for issuing Islamic securities.

The first and second chapters contribute to Islamic corporate finance literature. Islamic finance has a single capital market instrument, which is sukuk. The sector is small but flourishing with a total of USD 278,459 million worth of corporate sukuk in 2018. Sukuk combine the characteristics of bonds and shares; like shares, they represent ownership in the underlying asset/project, while they also has a maturity date and profit rate, similar to bonds. Sukuk with more debt characteristics are referred to as fixed-income sukuk (FIS), while profit-loss sharing (PLS) sukuk lean toward equity. Previous studies examine the features of Islamic investment securities against conventional bonds. On the one hand, they underline that the risk-return profiles of both instruments are correlated because they use the same benchmark (Krasicka and Nowak, 2012). Thus, sukuk are a replicate of bonds with an Islamic twist (Miller et al., 2007; Wilson, 2008). On the other hand, Raei and Cakir (2007) and Wilson (2008) provide evidence that risk-sharing differentiates sukuk, and that is shown in the stock market response to sukuk issuances.

We add to the literature by investigating the issuance of sukuk in an environment where traditional funding instruments such as bonds and equity are available. We focus on Malaysian firms, where we find that at least 112 firms issued sukuk, bonds and equity simultaneously during the period 2005–2017. That is, religion is not necessarily the motive for transacting via Islamic finance. Over the period 2001–2018, Malaysia issued 60.84% of total global sukuk. Our analytical approach is different because in both chapters we use the conventional corporate finance theory as a base for the analysis while (1) we make no assumptions about the differences between traditional funding instruments and sukuk, (2) we make no assumptions about the different types of sukuk being debt or equity, (3) we do not categorize firms as sukuk issuers versus bond issuers as that would eliminate the fact that firms issue sukuk and bonds simultaneously, and finally (4) our financial and accounting data has a quarterly frequency, enhancing the quality of the sample.

The first chapter studies the impact of firm opacity on the preference to issue sukuk, by looking at the informational sensitivity of sukuk when traditional funding instruments are available. The extant literature establishes two views. First, the structure of sukuk mandate comprehensive information disclosure and excessive contracting, which in turn, reduce uncertainty (Abdul Halim et al., 2017; Mohamed et al., 2014; Nagano, 2017). Second, the structure can be manipulated by managers to disguise firm information (Klein and Weill, 2016; Klein et al., 2018). We examine both views by measuring the opacity of Malaysian firms and estimating its impact on external funding decisions. In a multilevel multinomial logistic model, firms are to pick a funding instrument from a basket of conventional bonds, shares, bank loans and the different types of Islamic certificates. To the best of our knowledge, this is the first study to research the opacity of sukuk issuers.

We find that different levels of opacity trigger the issuance of different types of sukuk. Explicitly, opaque firms issue zero-coupon sukuk with higher probabilities (P=48.7%). Conventional bonds and FIS are the second and third preferred funding source for opaque firms. In line with corporate finance theory, transparent firms raise funds via shares. Our results highlight the significant role of opacity in determining the source of external funds. It also shows that firms distinguish between Islamic and traditional instruments and contrast between the types of sukuk. This chapter provides important insights into the understanding of sukuk characteristics and firms' capital structure in dual financial system countries. It also suggests that each sukuk type requires distinct monitoring and informational disclosure provisions.

In the same vein, the second chapter seeks to determine the place of sukuk on firms' financial hierarchies using the modified pecking order theory. Originally, choosing sukuk to raise funds was attributed to religious motives. However, the Malaysian data shows that some firms use traditional and Islamic instruments concurrently. We are particularly interested in when firms choose to issue sukuk when the conventional capital market is accessible. Corporate capital structure theory makes a clear distinction between debt and equity; such assertions are not straightforward for sukuk.

Several attempts have been made to explain sukuk in a capital structure context. However, the studies use firms' financial characteristics to proxy for capital structure theories. The second chapter empirically explores sukuk in a theoretical modified pecking order set-up developed by Leary and Roberts (2010). The framework specifies three versions of the Myers (1984) pecking order, where the deficit size is constrained by firms' minimum savings and maximum debt capacity. Our results indicate that when internal funds are exhausted, Malaysian firms prefer PLS sukuk over bonds and FIS over equity beyond firms' maximum debt capacity. This work contributes to our knowledge by addressing two issues: First, the ability to use conventional finance theory to understand Islamic finance. Second, the empirical verification of the normative judgement of Islamic principles, which is alone, inadequate for accurate application. It also confirms that there is a need for redefining Islamic debt, equity, and capital and restructure the regulatory framework taking into consideration the unique structure of Islamic investment certificates. Empirical analysis based on actual market data is essential for full utilization of the system's merits.

All in all, Islamic corporate finance and its capital market are the most interesting current discussions in the literature. Data availability, the growth of quality literature, and the constant urge to improve the economic conditions mandate deeper investigation of available solutions. We aim to complement the available theological analysis of Sharia principles, in order to mirror the full picture of the industry practices. In this thesis, our contribution is empirical and methodological, which results in important insights.

We use the same base sample for chapters II and III analysis. In both chapters we examine Malaysian firms that issued bonds, equity and sukuk simultaneously over the period between 2005 and 2017. External funding issuances details for each firm in every quarter, including the issuance size, date, duration and amount outstanding were collected from Bloomberg Pro-

fessional Terminal. We obtained equity issuances data and firm-specific financial information from Bloomberg, Compustat Global and SNL Financial. To measure opacity, Chapter II requires additional data on firm stock prices, trading volumes and spreads, which we collected from Datastream. Accordingly, the panel dataset we use in Chapter II is comprised from 107 Malaysian firms operating in 10 sectors, whereas in Chapter III it is comprised of 112 firms.[4]

In the last chapter, we contribute to the Islamic banking literature, which is the largest and oldest research stream. In practice, Islamic banking comprises more than 85% of the total industry's assets. Due to the prohibition on charging and receiving interest, Islamic banks are not allowed to offer loans and deposits similar to their conventional counterparts. On the contrary, they provide funding facilities based on lease contracts, cost-markup sales and partnerships. According to Sharia principles, partnerships and project-based financing are the core assets of Islamic banks.

Very few studies have examined the product mix of Islamic banks (Aggarwal and Yousef, 2000; Chong and Liu, 2009; Khan, 2010). They explore the change in the values of banks' products over 2 two consecutive years.[5] Collectively, the studies conclude that the difference between Islamic and conventional banks is minimal, and the services of the former are not unique due to the high proportions of debt-like facilities. However, there has been no formal analysis of Islamic banks' financing portfolios.

To address this gap, we examine the composition of Islamic banks' products using a new dataset to validate the claims that Islamic banks are identical to conventional banks. We examine the extent to which banking product degree of Sharia aspirations fulfilment affects Islamic banks' performance and solvency. We also look at the implications of product diversification on banks' financial stability and performance. For that purpose, we hand-collect the quarterly financial data of 25 banks operating in the Gulf Cooperation Council (GCC) countries for the period 2006–2016. A breakdown of Islamic financing facilities is not available in major databases. Product values are generally aggregated in a single category equivalent to conventional loans. From our dataset, we can track the value of each Islamic banking product for 40 quarters. It allows us to measure bank diversification by computing the Herfindahl-Hirschman Index (HHI) and the Shannon Entropy (SE).

We show that although debt-like products dominate Islamic banks, other products have a distinct and significant impact on performance. Specifically, while debt-like products contribute to banks' profitability, profit-loss sharing arrangements promote solvency. We find that banks' portfolio diversification varies over time and across countries. For GCC Islamic banks, concentration (more debt-like products) is directly related to profitability. On the other hand, product diversification is beneficial to bank solvency but harmful to returns. It also highlights the urgent need for a database compatible with Islamic financial reporting to enhance the accuracy and quality of empirical research. This chapter suggests that conventional assessment approaches are not necessarily applicable to Islamic banks. This is also true for regulations and supervisory considerations.

[4]Chapter II required financial data to compute opacity measures. Alas, such data were not available for 5 firms; hence the five-firm difference in the number of firms in the samples used in each chapter.

[5]1994–1995(Aggarwal and Yousef, 2000) and 2004–2006 (Chong and Liu, 2009; Khan, 2010).

To study the product mix of Islamic banks, the historical values of each banking product are required. However, currently available professional databases broadly aggregate all Islamic financing facilities under the loans category. As a consequence, there is no professional source (or database) which collects the historical values of Islamic banking products, other than banks' own financial statements and annual reports. To our knowledge, this thesis is the first to put together the quarterly data of the various Islamic financing facilities of 25 banks operating in the heart of the Islamic banking industry; the Gulf Cooperation Countries. To achieve this, we went through 1,200 financial statements to build a cross-sectional panel dataset comprised of five countries, 25 banks and 40 quarterly periods from 2006 to 2016. The remainder bank-specific financial data are obtained from Fitch International Bank Database, SP Global Market Intelligence and Gulfbase.

Overall, this thesis contributes to the evaluation and understanding of Islamic banking and finance by comparing scripture with empirical findings obtained from real-world data. In the first two chapters, we show that conventional capital structure theory can accommodate Islamic instruments and that the market comprehends the features of each instrument. In the third chapter, we show that the combination of products with different levels of Sharia aspirations achievement is ideal for banks' performance and financial stability. The next section presents an overview of Islamic banking and finance principles and products.

I. Islamic Banking and Finance: An overview

Money and trading cannot be made religious. Some scholars attempt to direct the discussion to a specific audience, namely Muslims, when addressing Islamic finance . In our research, we accentuate that Islamic finance's name refers to its sources of guidelines, which are the Islamic teachings from the *Quran* and *Sunnah*.[6] These resources did not specify the system's beneficiaries. However, one cannot ignore the fact that the first formal Islamic finance experiments were faith-based. Early Islamic investment operations took place in Pakistan during the late 1950s. The first institutionalization experiment was in Egypt in the early 1960s by the Mit-Ghamr Islamic Saving Association (MISA). The association managed the savings of Muslim investors according to Sharia principles. A similar investment-based institution was established in Malaysia to help Muslims save to afford their pilgrimage (Hajj). Later in the 1970s, formal Islamic financial institutions emerged such as the Islamic Development Bank (IDB) and Dubai Islamic Bank (DIB).

The difference between conventional and Islamic finance is characterized by Islamic principles, sometimes referred to as Islamic prohibitions. Scholars discuss Islamic principles with respect to five prohibitions. The first stipulates no charging or accepting interest and usury (Riba). This prohibition is the most controversial. The second forbids taking excessive risk (Gharar), which leads to the third restriction, which is on pure speculation or gambling. Fourth, Islamic-based transactions cannot involve trading commodities such as alcohol or being involved in activities

[6]The *Quran* is the Islamic holy book and *Sunnah* is the reported sayings, action and silent approvals of Prophet Mohammed. They are also called *Hadith*.

such as pornography. Fifth and last, is the prohibition that no transaction shall be executed without the consent of both parties. Either party should not be forced against their will while conducting business (El-Gamal, 2006; Hussain et al., 2015; Obaidullah, 2005). Contemporary banking and finance practitioners designed financing products that fulfill funding needs and are compliant with Islamic principles.

In June 2018, the Islamic finance industry recorded an 8.3% growth rate with total assets over USD 2 trillion. The banking sector is still dominating the industry with a 76% share. Capital market instruments come next, constituting 23% of the industry's'= assets. The volume of outstanding sukuk, the Islamic capital market tool, grew by 19%. The Gulf Cooperation Countries (GCC) host the largest proportion of Islamic banking assets; it reached USD 683 billion in 2018 (42% of total banking assets). Sixty per cent of total sukuk are issued in Asia. According to the Islamic Financial Services Board (IFSB) the industry maintained its stability and resilience despite the current economic and political challenges.

Given its growth and potential, the Islamic finance guidelines were incorporated in banking and finance products, standards, regulations, and financial infrastructure. However, the issue of standardization and regulation is still challenging due to the different interpretation of the Islamic teachings depending on sects and beliefs. Nevertheless, a number of organizational bodies were established to set grounds for governing and standardization issues such as the Islamic Financial Services Board (IFSB), which produces regulatory and supervision guidelines. The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) is responsible for issuing accounting, reporting and governance standards, while the International Islamic Financial Market (IIFM) was established to stimulate the trading of Islamic investment certificates (sukuk) through producing issuing and trading guidelines.

In this section, we present a brief discussion of Islamic finance principles and Islamic financing facilities to set the groundwork for the three main chapters.

I. The Principles

The prohibitions can be explained in terms of three transacting principles: equity, participation and ownership. Scholars assert that the rationale for prohibiting interest is to protect the borrower; being the weaker contracting party. They also affirm that discouraging excessive risk and uncertainty is to build transparent transacting grounds with limited information asymmetry. Both prohibitions call for the principle of equity in business and financial transactions (Hussain et al., 2015). The principle of participation is based on similar attributes. It inhibits the creation of debt and argues that all financing activities shall be tied to real economic actives. Consequently, making a profit is only justified by taking a considerable risk and it cannot be guaranteed. Also, the probability of making a loss is never zero. Finally, the principle of ownership states that transactions should be asset-based; asset tangibility is a key transacting requirement, as money cannot be traded.

The Islamic finance principles restrict financial institutions from investing in risky instruments such as derivatives, toxic assets and short-selling. Also, as speculation is prohibited, trading

of debt and high-leverage transactions are not allowed either. The limited product menu reduced the severity of the 2008 financial crisis. Nevertheless, Islamic financial institutions were affected by the plunge in asset prices. The system was not immune; losses were recorded as non-performing financing rocketed. However, defaults and bankruptcies were minimal (Hussain et al., 2015). In the following section, we elaborate on the two main prohibitions.

Riba

Interest or *Riba* (in Arabic) precisely means an increment or growth. In Islamic finance, *Riba* is defined as any unlawful or undeserved gain derived from the quantitative inequality of the counter-values (Warde, 2000). It is also the trading of two goods of the same kind in different quantities where the increase is not a proper compensation (El-Gamal, 2006). Further, Siddiqi (2004) highlights that according to the Quran, *Riba* means "what is over and above" and that it is unjust, categorically prohibited, and it is destined to destruction. The prohibited *Riba* include both, interest on loans agreed-upon at the time of the contract and any subsequent increase resulting from rolling over the interest rate in the case of the borrower payment delay. Hence, *Riba* is continuous process of diminishing because it does not spur growth to the social wealth (Iqbal and Mirakhor, 2011).

Correspondingly, the Quran established a relationship between *Riba* and the appropriation of other people's wealth without any justification, which can be further associated with more serious social and economic crimes. In particular, when a loan contract is concluded, it gives the lender an instantaneous claim to the borrower's property. Such a claim is unjustified because it is beyond the legal framework of recognized property rights (Siddiqi, 2004). The Islamic principles, however, are based on protecting property rights through the sacredness of contracts (Iqbal and Mirakhor, 2011).

Islamic jurisdiction questions the legitimacy of *Riba* as a form of compensation. It is important to underline that Islam does encourage trade and business and bearing their particular risk. Nevertheless, it states that interest and profit are entirely distinct. The foundation in Islamic commercial teachings is that capital is not profitable by itself. In other words, money does not generate money without the investment of labour, knowledge and experience. Additionally, in a trade, both parties gain from the transaction. One would collect their investment return while the other party utilizes the good or service. Conversely, in a loan transaction, the lender would secure or predetermine their required return regardless of the other party's position at the end of the grace period (Algaoud and Lewis, 2009; Chapra, 1985; Obaidullah, 2005; Zaher and Kabir Hassan, 2001).

Proponents of Islamic finance justify the prohibition of interest with four vindications. First, interest cannot compensate for time. Specifically, they question if the theory of time preference can explain the vast savings activities, because the generalization of the preference to consume today rather than tomorrow fails to explain the available savings used in investments. Second, the grace period imposes a time constraint on the borrower to gain a certain amount of profit in the case of business loans. Hence, the probability of a business downturn is ignored. Further,

in the case of personal loans, a person might engage in another credit line to fulfill the interest requirement. Third, scholars assert that it is irrational to adopt interest as a measure of risk. Risk is not a commodity that be can priced. Risk is determined by the nature of the traded asset, economic environment and business/personal preference (Mills and Presley, 1999). A uniform measure would be misleading. The last argument is against defining interest rates in the semantics of rent. Explicitly, rent is defined as the amount of money one would receive after allowing someone else (the renter) to benefit from the items owned. The owner invested capital and time to maintain these items and they are subject to wear and tear. The previous definition does not apply to interest on money (A'la Mawdudi, 2013). To sum up, money or currency is a medium of exchange and according to Islamic finance, shall be used within its natural scope. Exploiting its role can be extremely harmful. Admitting that currency was abused during the Great Depression, the Chairman of the Bank of England called for distributing food catalogues in case the economy returned to a barter system. (Ahamed, 2009).

From another perspective, Warde (2000) argued that the prohibition of interest only applies to particular commodities mentioned in the Hadith. He added that one should look Sharia scholars who declared that there is no clear difference between Islamic and conventional financing as they both have the same goal.

Gharar

Gharar usually reflects risk or uncertainty. A valid counterclaim would be to ask how something that is beyond human control can be prohibited. Thus, justification is needed. Islamic finance forbids the sale of items whose existence or characteristics are not certain, the risky nature of which makes the transaction akin to gambling, according to Professor Mustafa Al-Zarqa.[7] Examples of such uncertainties include lack of information, the sale of an object that is not owned, and deceptive transactions. We can add intentional risk shifting and unnecessary risk taking to that (Iqbal and Mirakhor, 2011; Warde, 2000). It is important to underline that scholars have distinguished between excessive and minor (acceptable) *Gharar*. The latter is the congenital probability of profit and loss in any undertaken business. However, excessive risk is associated with *"selling fish in the sea"* or speculating via derivatives. Uncertainty resulted in transferring risk from those who know little to those who know less, as in the 2008 subprime crisis. Sharia scholars described Gharar as an event that has a pleasant appearance but a hated essence (Dhareer, 1997; Warde, 2000).

Humans avaricious nature, or the desire to get something from nothing, is the foundation of prohibiting excessive risk. Allowing for such activities in the financial system would damage the distribution of wealth . Besides, it would harm trade equalization in terms of profit likelihoods. It also has an addictive essence, as with gambling, that would abolish the sacred role of trade (A'la Mawdudi, 2013; Warde, 2000).

[7]Sheikh Muhammad Al-Zarqa was recognized as one of the top Fiqh scholars of the 19th century.

II. Islamic Financing Products

In light of the above discussion, the only way an investor can claim compensation for the sacrificed time, money or borne risk is to share the profit– if any – generated by a project. That would lead to the concept of the profit-loss sharing principle in financing facilities. Islamic finance supports cooperation among the haves and the have-nots. It proposes various financing schemes, which are organized in three categories: profit-loss sharing, fixed-income and fee-based financing (Hussain et al., 2015; Kammer et al., 2015; Lewis et al., 2001; Obaidullah, 2005; Sundararajan and Errico, 2002). While conventional financial transactions are based on money as a commodity, Islamic finance requires the presence of tangible assets in most transactions. In Table I.1, we present a comparison between conventional and Islamic modes of financing. We describe the Islamic financing modes briefly in the following section.

Profit-Loss-Sharing Financing Modes

PLS products are deemed to be the *most* Sharia-compliant as they incorporate the principles of profit-loss sharing and participation, and are linked to real economic activity. However, its actual application is modest compared to fixed-income financing modes (Aggarwal and Yousef, 2000; Chong and Liu, 2009; Khan, 2010). PLS contracts can be thought of as limited duration equity investments (Farooq and Zaheer, 2015), they include Mudharabah and Musharakah contracts.

Mudharabah

This type of contract represents a partnership agreement between two parties: an investor (or funds supplier) and an entrepreneur. The investor provides 100% of funds required for the project/business, and the entrepreneur provides skills, effort and management. It is similar to a silent-partnership set-up. The two parties agree on the profit-sharing rate at the time of contracting. Profit is solely generated from operating the underlying project or asset. In unfavorable situations, the investor bears all losses unless it was proved that the entrepreneur's misconduct caused the loss. In Islamic banking, such an arrangement can be found in the assets and liabilities sides of the balance sheets. (Obaidullah, 2009). In Figure I.1, we show a simple Mudharabah facility.

Musharakah

It translates into English as "participation". Unlike Mudharabah, it is similar to a joint venture, or project financing arrangement. Investors and entrepreneurs mutually collaborate in terms of capital and management skills. All parties would agree upon the business model and required resources. The agreement also states the acceded profit-sharing ratio. Hence, if the project turned profitable, all parties would share profits based on the designated ratio. However, in the case of loss, each party would bear losses proportionate to the capital contributed. According to Hussain et al. (2015), it is the most authentic financing mode. We present a simple Musharaka transaction in Figure I.2.

Fixed-income Financing Modes

Fixed income or non-PLS products are the most utilized mode of financing. They serve various financing needs such as asset rental and personal and corporate credit. They are – to some extent – similar to conventional financing products, but they are compliant with Sharia guidelines.

Murabaha

Murabaha structure is similar to mark-up sale or the conventional asset-backed loans. In Murabaha, a bank purchases a designated asset (desired by the customer) and sells it (and delivers it) to the customer on a deferred payment basis. Therefore, the customer repays the asset price plus the sale mark-up, but not interest. Once the Murabaha contract is signed, the financing amount cannot be changed, and the bank cannot charge penalties unless the customer defaults intentionally. This transaction aims to facilitate the acquisition of assets (Hussain et al., 2015). Murabaha can also be used as an interbank liquidity management tool and in international trade transactions.

Ijarah

Ijarah has many frameworks. To some extent, it replicates the standard operating and financial leases. It is a popular debt financing product. It is a contract of sale of the right to use an asset for a period of time (Hussain et al., 2015). Principally, the bank, through a vendor would lease an asset to a borrower. The bank as the legal owner of the asset would hold the ownership until the end of the lease contract. Although the lease duration is predetermined, lease payments are adjusted for the economics and business conditions. At the end of the contract, the asset is sold or gifted to the borrower. Alternatively, in some rare cases, it is released to another client. Rentals are paid in periodic installments as in a Murabaha contract.

Salam

Forward contracts are not permissible in Islamic finance because they violate the condition of physical possession of the underlying asset. However, there are some exceptions for special types of projects, as in Salam and Istisna' contracts. Salam is a forward agreement with a future delivery and a spot payment. Agricultural businesses are ideal candidates for Salam contracts, where returns are only attained after some time. The transaction has a number of conditions: (1) commodity price, quantity and delivery time shall be specified upon signing the contract, (2) the amount should be paid in full on the spot, otherwise it is a non-Islamic exchange of debt for debt, (3) the seller's inability to deliver the agreed commodity gives the buyer the right to claim their funds (without penalties) or wait for the goods to be available and (4) a collateral such as mortgage, advance payment or a financial guarantee can be requested to reduce credit risk.

Istisna'

Similar to Salam, Istisna' is a forward contract tailored for construction and manufacturing projects. However, both payment and delivery take place in the future. The transaction requires three parties: the producer (or the manufacturer), the client and the bank as an intermediary. The client requests a product with certain specifications be delivered by the producer. The bank facilitates production financing. The bank agrees to make short-term installments to the producer while accepting periodic longer-term payments from the client.

Fee-Based Financing Modes

Islamic financial institutions facilitate financial transactions by providing other services such as agency (Wakalah) and gurantee (Kafalah). Wakalah is an agency arrangement, where the bank acts on behalf of the client in credit letters and bank transfers. Kafalah, however, is a financial guarantee where the bank provides a pledge to creditors on behalf of its customer (debtor) to cover financial liabilities. Banks charge different fees and commissions by providing such services. These services play a significant supporting role in Islamic financing modes.

III. Sukuk

Islamic investment securities or sukuk are the second largest segment of the Islamic finance industry with USD 399.9 billion worth of outstanding sukuk in 2017. Sovereign sukuk dominate the market with 79% of total outstanding sukuk. However, the share of outstanding corporate sukuk has increased to 21% in 2016 (Figure IV.15). Malaysia accounts for 60% of corporate sukuk issuances. The United Arab Emirates, Saudi Arabia, Turkey, and Qatar follow. It is the only money and capital market instrument in Islamic finance. The AAOIFI define sukuk as *"certificates of equal value representing undivided shares in the ownership of tangible assets, usufructs, and services or (in the ownership of) the assets of particular projects or special investment activities"*. According to the IIFM, sukuk are commercial papers that provide investors with partial ownership of an underlying asset. Sukuk are used to finance sovereign and corporate activities.

Sovereign issuances paved the way for corporations to tap the Islamic capital market by setting prices and creating benchmarks. Also, central banks use sovereign sukuk as a liquidity management tool. Financing a country's infrastructure projects is one of the most important applications of sukuk (Hussain et al., 2015; Kammer et al., 2015).

Sukuk combine features from bonds and shares. They are similar to shares because they represents partial ownership of the underlying asset or project, and their cash flow is not fixed. Also, the certificates have a maturity date, a profit rate, a particular cash flow stream and a nominal value. The main difference between sukuk and traditional financing tools is their structure such as the requirement for an underlying tangible asset and the presence of a special purpose vehicle (SPV).

The cash flow generated by sukuk depends on the structure of the Islamic finance product used to design the sukuk. It can be fixed-income, profit-loss sharing (partnership) or a mix of both. That emphasizes the role of the underlying asset in the structure of sukuk. Accordingly, it is possible to categorize sukuk as asset-based and asset-backed sukuk. Asset-based or fixed-income sukuk has two essential features.[8] Despite the mandatory requirement of the involvement of an asset in the transaction, the cash flow of this type of sukuk is predetermined. Thus, the profit rate is agreed upon at the time of issuance. The profit payments do not depend on the performance of the asset. As a consequence of the predetermined profit rate, the risk is transferred to the borrower. Investors recourse to the issuer to claim their profit in the case of sukuk default. Such characteristics cause the debt-like sukuk to lean more toward the structure of conventional bonds.

On the other hand, the cash flow of asset-backed or profit-loss sharing sukuk depends on the performance of the underlying asset or project.[9] Profit is not guaranteed, and losses are shared between investors and the issuer. Hence, asset-backed sukuk are closer to equity shares. Scholars believe that the latter type of sukuk are more Sharia-compliant and do not mimic conventional bonds. Ownership is an essential aspect of all sukuk types. In asset-based sukuk, the asset ownership is transferred to the sukuk-holders in the case of default without the need for legal interference.

Sukuk can also be zero-coupon. They carry a fixed rate of return, are sold at a discount and are not tradeable because they do not include an underlying asset. Hence, they are a pure debt to the issuer. Researchers indicate that zero-coupon sukuk are usually structured as Murabaha or Istisna' sukuk. Adesina-Uthman (2015) details that in a Salam transaction, the amount is paid in full in advance and the good is to be delivered in the future. Hence, debt is created, and trading is not permissible. In an Istisna' transaction, both the asset and its price are delivered at a predetermined date in the future. In a Murabaha contract, the payment is required to be made to a third party; hence, it would represent trading money for money. Hakim (n.d.) define zero-coupon sukuk as certificates issued while the underlying asset does not exist (yet) or is not completed at the time of the issuance.

There is an ongoing debate on how different are sukuk from conventional bonds. Sukuk, like all Islamic finance products, use an interest rate such as LIBOR to benchmark their profit rates. They do in order to compete and fit in the conventional financial system. Therefore, sukuk and conventional bonds have similar risk-return profiles, suppressing any diversification potential (Krasicka and Nowak, 2012). According to Wilson (2008) and Miller et al. (2007), sukuk are not an innovation; rather, they are bonds with a religious twist. On the contrary, Godlewski et al. (2013) assert that the stock market reacted differently to the announcement of sukuk issuance compared to conventional bonds. Also, risk-sharing differentiates sukuk from conventional bonds that generate diversification gain (Raei and Cakir, 2007). The difference between sukuk types has little empirical evidence. Grassa and Miniaoui (2018) affirm that Malaysian firms perceive no difference between PLS and FIS when raising external funds.

[8] Based on Murabaha (cost-plus), Ijarah (leasing), Istisna (undertaking) and Salam (prepayment) contracts.
[9] Based on Musharakah and Mudarabah (partnership) contracts.

II. Appendix

I. Tables

Table I.1.: Islamic Financing Products

Islamic Finance Product	**Conventional interpretation**	**Conventional alternative**
Murabaha	Cost- plus financing	Loans
Ijarah	Lease	
Mudharabah	Partnership with a silent partner	Loans and deposits
Musharakah	Partnership	Loans and deposits
Salam	Advance purchase	Loans allowed for certain goods
Istisna	Commissioned manufacture	Loans allowed for certain projects

The table presents Islamic banking products and the corresponding conventional interpretation and alternative.

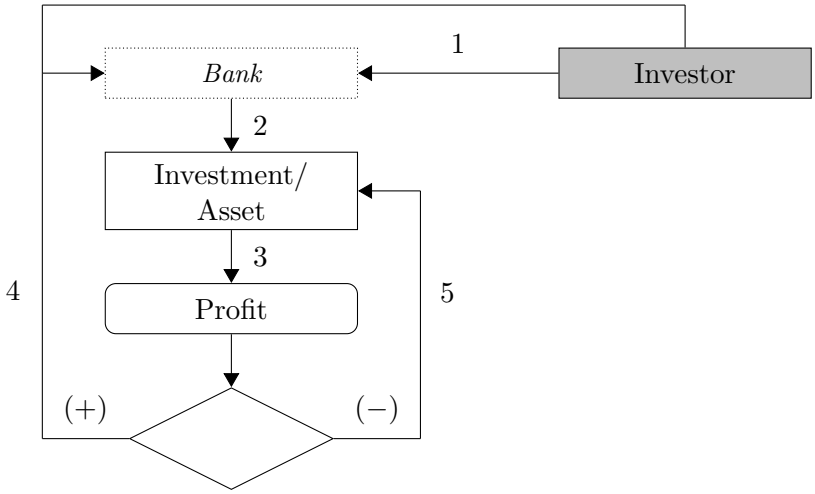
Table I.2.: Sukuk Characteristics per Type.

	Fixed Income Sukuk	**Profit-Loss Sharing Sukuk**
Underlying trade contracts	Murabahah (cost-plus)	
	Ijarah (leasing)	Musharakah and Mudharabah (partnership)
	Istisna(undertaking) Salam(prepayment)	
Asset Role	Asset-based	Asset-backed
Characteristics	1.Cash flow is predetermined	1.Cash flow depends on the performance of the underlying asset
	2.Risk is transferred to the borrower	2.Profit is not guaranteed 3.Losses are shared between the issuer and investors
Fulfillment of Sharia Aspirations	Less	More
Tradability	Only Ijarah Sukuk are trade-able	Trade-able

The table presents sukuk contracts and their characteristic.

II. Figures

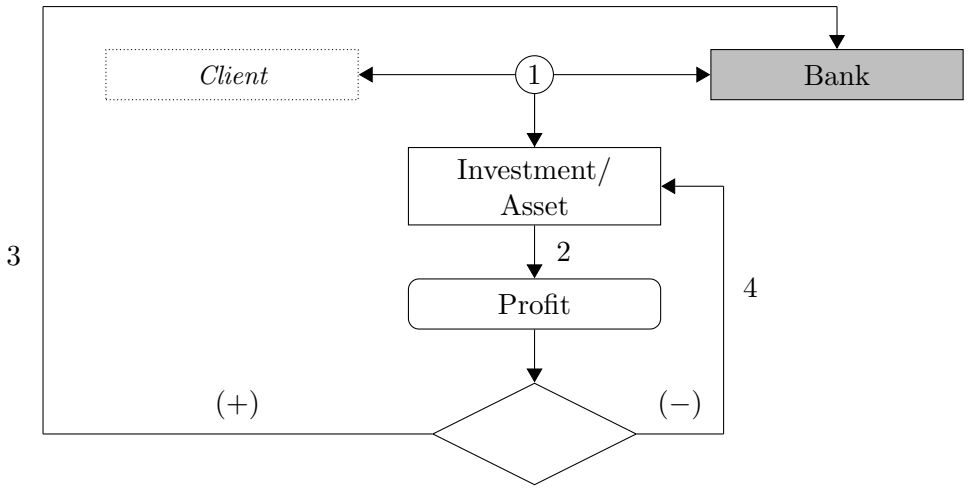
Figure I.1.: Simple Mudharaba Contract Structure



source:(Obaidullah, 2005)

1. Depositor and Bank discuss terms of Mudharaba; Depositor provides funds to Bank.
2. Bank invests funds in assets and projects and manages its operations.
3. Business generates positive or negative profits;
4. Profit if positive, is shared between Depositor and Bank as per a pre-agreed ratio.
5. Profit if negative, is absorbed by Depositor; effectively bringing down the value of the asset created with its investments and the value of the deposit.

Figure I.2.: Simple Musharakah Contract Structure



source:(Obaidullah, 2005)

1. Client and bank discuss business plan and jointly contribute to capital of the venture.
2. Client and bank jointly set up the business venture and manage its operations, sharing the responsibilities as per pre-agreed terms; business generate positive or negative profits:
3. Profit if positive, are shared per a pre-agreed ratio.
4. Profit if negative, are shared in proportion to capital contributions; effectively bringing down the asset value while keeping their respective shares in it unchanged.

Figure I.3.: Global Sukuk Issuance over the period 2000-2017

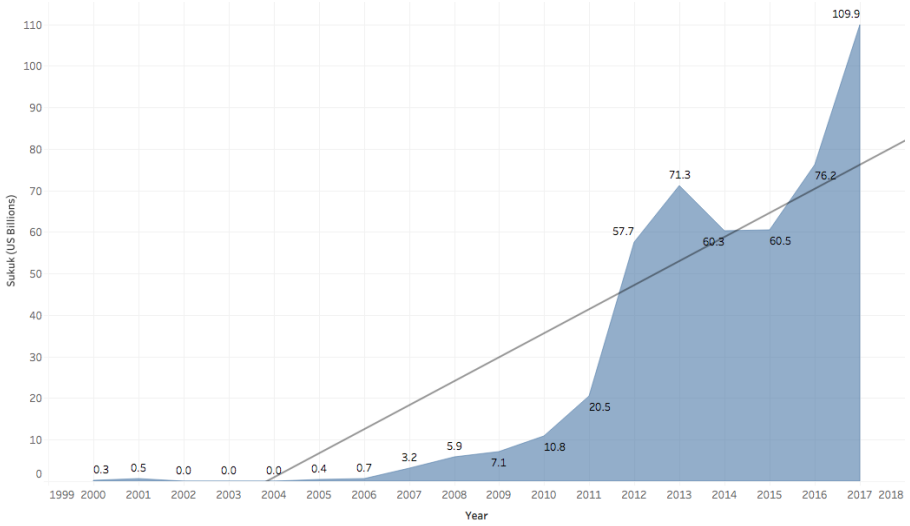
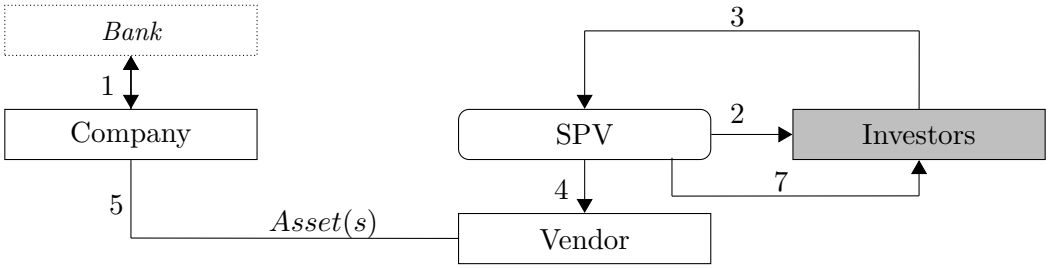


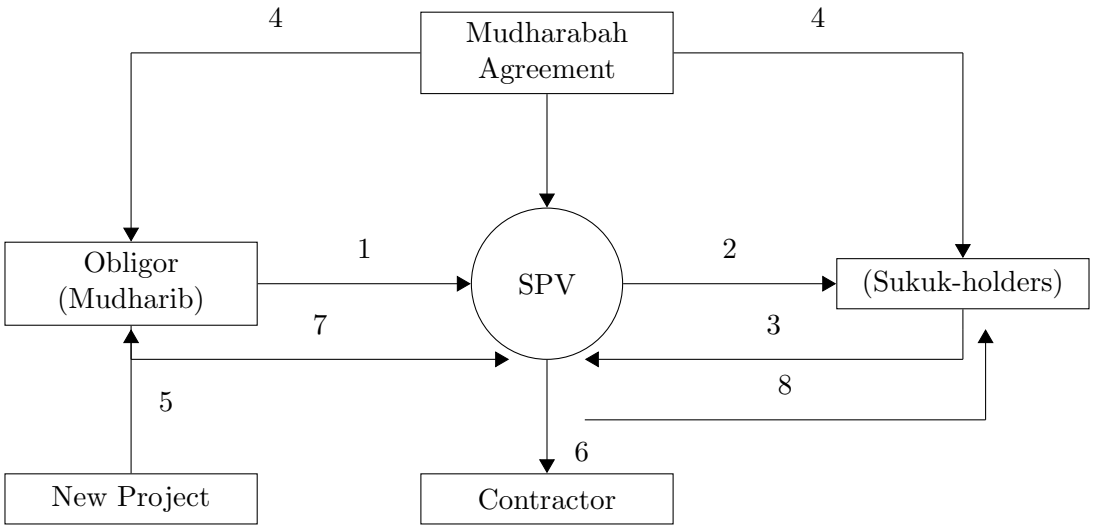
Figure I.4.: Simple Ijarah Sukuk Structure



source:(Clifford Chance, 2009)

1. Company seeks advice from Investment Bank regarding issue of securities; an SPV is created for the purpose.
2. SPV issues securities to investors.
3. SPV collects funds from investors.
4. SPV pays to Vendor for purchase of Assets.
5. Company as agent of SPV takes delivery of Assets.
6. Company takes Assets from SPV on Ijarah and makes payment of Ijarah rentals to SPV;
7. SPV passes them on to investors after deducting Mudharib (Entrepreneur/ Wakalah fee for itself.

Figure I.5.: Simple Mudharabah Sukuk Structure



source:(Clifford Chance, 2009)

1. A company establishes a special purpose veichle (SPV) for the purpose of financing an asset.
2. SPV issues sukuk which represent an undivided ownership interest in an underlying asset. They also represent a right against the SPV to payment of expected periodic return from Mudharaba profit.
3. The investors subscribe for sukuk and pay the proceeds to the SPV. The SPV declares trust over proceeds and thereby acts as as Trustee on behalf of the investors.
4. The SPV and the company (orignaotr) enter a Mudharaba agreement with the company as a Mudarib (manager) and SPV as the financier, under which the SPV agrees to contribute the principle amount for the purpose of Sharia compliant Mudharaba enterprise.
5. The SPV make progress payments to an appointed contractor of the plant/asset
6. The company, as Mudarib under the Mudaraba Agreement, agrees to contribute its expertise and management skills to the Shari'a compliant Mudaraba enterprise, with responsibility for managing the SPV cash contribution in accordance with specified investment parameters.
7. Issuer SPV receives the Mudaraba profits and holds them as Trustee on behalf of the Investors.
8. Issuer SPV (as Trustee) pays each periodic return to Investors using the Mudaraba profits it has received under the Mudaraba Agreement

Chapter II.

Firm Opacity and Islamic Securities Issuance

Proponents of Islamic Finance argue that Islamic investment certificates (sukuk) require higher degrees of information disclosure, extensive contracting and involve lower levels of uncertainty, thus promoting transacting transparency. Recently, however, scholars argue that the structure of these certificates can be manipulated by managers to obscure firm information. In this paper, we investigate both views by examining the relationship between opacity and external capital structure decisions when Islamic investment certificates are available. We construct an opacity index using eight indirect opacity measures (market microstructure-based and stock-return-based) for 107 Malaysian firms for the sample period 2005-2017. We apply a mixed-level multinomial logistic model. We find that as opacity levels increase, the probability of firms issuing zero-coupon sukuk is the greatest, followed by conventional bonds and profit-loss sharing sukuk. The probability of issuing equity is negative at all opacity levels. Our results suggest that issuing zero-coupon sukuk requires more supervision, which has important implications for policy-makers and investors.

Keywords: Corporate Capital Structure, Opacity, Islamic Finance, Sukuk, Emerging Markets, Multilevel Multinomial Logistic Model

I. Introduction

The capital structure theory stresses that the choice of funding instrument requires some degree of public exposure (Myers, 1984). The extent to which a firm is willing to be exposed governs the choice of financing decisions when in need for external funding. Corporate finance theory suggests that using internal funds is the least informationally-sensitive option followed by bond issuances. Issuing equity is the most informationally-expensive tool; therefore, it is considered the last resort for raising funds (Jin and Myers, 2006). The informational charactrastics of Islamic investment securities (sukuk) are still debated.The proponents of Islamic finance claim that because of Sharia principles, issuing sukuk requires higher degrees of information disclosure and extensive contracting, and involve less uncertainty, thus promoting transacting transparency (Abdul Halim et al., 2017; Ebrahim et al., 2014; Mohamed et al., 2014; Nagano, 2017). However, other scholars argue that the structure of these certificates can be manipulated by managers to obscure some firm information (Klein and Weill, 2016; Klein et al., 2018). In addition, recent data show that faith is not the sole incentive for Islamic transactions.This study tests the information sensitivity of sukuk by investigating the relationship between firm opacity and the preference to issue sukuk.

In this chapter, we investigate whether the tendency of firms to limit information revelation affects the choice of external funding instrument beyond bonds and equity. Mainly, we examine the informational sensitivity of Islamic investment certificates (sukuk)[1] by investigating the relationship between firm opacity and the preference to issue sukuk. We study the funding preferences of 107 Malaysian firms against measures of opacity. We choose Malaysian firms because they have access to both conventional and Islamic instruments to raise required funds as they operate in a dual financial system. Malaysia hosts 60% of the total global corporate sukuk issuances. We find evidence that opaque firms have a strong preference for a particular type of sukuk, specifically, zero-coupon sukuk followed by conventional bonds and profit-loss sharing sukuk. Thus, different levels of opacity trigger the issuance of different types of sukuk.

Our study makes several contributions to the growing empirical Islamic finance literature, particularly in corporate finance. Our first contribution lies in explaining the issuance of corporate sukuk in dual financial system economies. The extant studies (Abdul Halim et al., 2017; Grassa and Miniaoui, 2017; Mohamed et al., 2014; Nagano, 2017) use financial firms' characteristics to examine the motives of sukuk issuances, and test groups of sukuk issuers against bond issuers. We extend this literature by focusing on the effect of the informational feature of sukuk on firms' financing decisions given the availability of traditional funding sources. We do not segregate the sample into sukuk issuers versus bond issuers to compare; instead we track the firms' preference change toward the different instruments over 40 quarters. We consider all firms that issued both sukuk and traditional capital market instruments over the period from 2005 to 2017.[2] The high frequency of observations is our second contribution. We verify the market perception of Islamic finance instruments and its guidelines empirically, which have been heavily discussed

[1] Chapter I provides a thorough discussion of sukuk and Islamic financing products.

[2] The first sukuk issuance was in 1999. The frequency of issuing corporate sukuk is small before 2005, which results in gaps in the dataset.

in normative judgment and narrative-based analysis. We do so by using advanced econometric methodologies. We apply multinomial multilevel econometric models to account for sectoral and firm-level prospects. To the best of our knowledge, the opacity of firms issuing sukuk is not yet investigated.

Islamic Investment certificates or sukuk are defined by the AAOIFI[3] as certificates of equal value representing undivided shares in the ownership of tangible assets, usufructs, and services or (in the ownership of) the assets of particular projects or special investment activity. Sukuk can take different forms depending on the underlying product structure. We categorize sukuk based on their structure and cash flow. Specifically, fixed income sukuk (FIS) are based on cost-plus sales and lease contracts, while profit-loss sharing sukuk (PLS) are based on partnership and project-financing contracts.[4] Zero-coupon sukuk (ZCS) represent pure debt, which are sold at a discount and are non-tradable. This break-down of sukuk types is essential in our paper because each category entails different level of information disclosure.[5]

Regardless of sukuk type, scholars highlight sukuk features that promote transparency and encourage enhanced information disclosure. For instance, sukuk require precise identification of the asset or project being financed and generating revenues. Jobst (2007) accentuates that investors are imperatively partial owners of the underlying asset. Sukuk structure shall ensure the risk-return sharing between participants and that it is not a debt-transaction. The process of issuing sukuk involves extensive documentation and clear contracting specifying participants roles. Further, special purpose vehicles (SPVs) are a vital element of sukuk structure.[6] It protects sukuk holders from adverse events caused by the originator's other projects and operations (Abdul Halim et al., 2017; Ebrahim et al., 2014; Nagano, 2017).

Conversely, Klein and Weill (2016) and Klein et al. (2018) argue that the existence of SPVs in sukuk structures motivate managers to move troubled projects from the originator's books and transfer the risk to other stakeholders, namely the sukuk holders. By doing so, managers have no incentive to monitor or maintain the performance of the projects as long as the originator is not affected. However, the degree of manipulation depends on the sukuk structure. In our study, we take into consideration all sukuk structures. Our results show that Malaysian firms do differentiate between the types of sukuk. Opaque firms' first external funding preference is zero-coupon sukuk (average issuance probability = 48.7%), which is a non-tradable bond-like type of sukuk. Profit-loss sharing sukuk, which is – in theory – a partnership arrangement with an exhaustive information requirement, is the third preference for opaque firms (average issuance probability = 6.3%).

We empirically relate sukuk characteristics mentioned earlier to firms' preference to issue sukuk over other funding instruments. The characteristics of both firms and funding instruments impact financing decisions. In particular, firms with low corporate transparency might find

[3]AAOIFI is the Accounting and Auditing Organization for Islamic Financial Institutions.

[4]Fixed income sukuk contracts include Murabaha, Ijarah, Wakalah, Salam, and Istisna'a. Profit-loss sharing sukuk contracts are Mudarabah and Musharakah.

[5]Chapter I provides a thorough discussion of sukuk and Islamic financing products.

[6]The role of SPVs in sukuk is similar to its rule in Asset-Backed-Securities (ABS) in conventional finance. It separates the parent company from the securities issuer to protect it and the investors from any adverse outcomes.

sukuk an attractive funding alternative when information disclosure is expensive. This paper addresses the following question: Are firms' funding decisions triggered by sukuk structure and its informational requirements? We do not intend to verify any capital structure theory; we focus on the degree of firms' transparency relative to the source of external capital.

Opacity can be defined as the information wedge between all insiders and all outsiders (Bharath et al., 2009) or the inability of the outside investor to accurately value a firm (or an asset of a firm) due to the lack of information, as compared to inside managers who possess more information (Jin and Myers, 2006). Information plays a great role in firms' operating and funding decisions. Literature concurs that the firms' level of transparency cannot be directly observed. Consequently, scholars develop a set of indirect measures to proxy for opacity.

Recently, Dahiya et al. (2017) have categorized opacity measures into three groups: stock-return-based, market-microstructure-based, and analysts-based. In our paper, we measure opacity using the former two groups of variables.[7] The first set of measures are based on stock-return synchronicity and asymmetry. Jin and Myers (2006) argue that stock return-synchronicity, measured by the goodness of fit of a market model (R^2) is a valid proxy for firm opacity. They assert that uninformed outside investors base their trading on market factors rather than firm-specific information. That results in higher R^2, indicating higher opacity levels. Also, they contend that negative residual returns outliers indicate a higher probability of a crash and thus higher opacity. Accordingly, the measures we use are (1) quarterly R^2 obtained from market model regressions of excess daily returns, and (2) the skewness of return residuals obtained from earlier market model regressions.

The second category is market microstructure measures. They are based on the relationship between liquidity, trading cost, and investors' information. Scholars argue that, if investors are uninformed, they are reluctant to trade; therefore, stocks become illiquid and their transaction costs increase. Hence, measures include (1) the price change per dollar of daily trading volume (AMIHUD) (Amihud, 2002), (2) stocks trading volume, (3) the number of shares to be traded to cause a price change (Amivest) (Cooper et al., 1985), (4) the effective bid-ask spread (Roll, 1984), (5) the quoted bid-ask spread, and (6) the volume-return coefficient.

We also use firm characteristics such as firm size, leverage, solvency, liquidity, firm market value, and profitability as control variables (Frank and Goyal, 2009). Bharath et al. (2009) assert that opacity measures do not substitute firms' characteristics impact, but each represents a different type of information asymmetry.

We use the eight indicators explained above (two stock-return based and six market-based measuers) to construct an opacity index following Anderson et al. (2009) and Duru et al. (2013). We rank the variables into ten deciles with the most opaque firms assuming a value of 10 and the least opaque firms obtaining a value of 1. The eight rankings are then added for each firm in every quarter and divided by 80, which is the maximum possible total points. That generates a single variable (an index) with values ranging from 0.1 (transparent) to 1 (opaque). This

[7] Analysts-based measures required information that was not available for Malaysian firms.

index is our main explanatory variable. Our paper highlights a significant relationship between opacity and the source of external funding.

We apply a multilevel (hierarchical) multinomial logit model to examine the impact of opacity (measured by the opacity index) on firms' external funding decisions. The multinomial dependent variable takes values from 1 to 6, indicating issuance of conventional bonds, FI sukuk, PLS sukuk, zero-coupon sukuk, shares, and bank loans respectively. Multilevel models allow for both, between and within variation compared to panel specifications and produce more accurate results. The model also assumes a correlation between and within nested groups, which are firms and sectors in our paper. It is logical to expect some degree of correlation between firms operating in the same sector and between firms operating in the same period and facing similar macroeconomic conditions (Gelman, 2006). We use a Generalized Structural Equation Model (GSEM) to run our estimation. GSEMs overcome problems such as measurement errors and multicollinearity in explanatory variables encountered when using OLS regressions (Chang et al., 2009; Schumacker and Lomax, 2016).

Our data consists of 107 Malaysian firms operating in 10 sectors.The sample used in this investigation is a subsample of 112 firms that have issued bonds, equity and sukuk concurrently in the period between 2005 and 2017. Five companies were excluded because of missing financial market data which are required to compute opacity measures. We obtained data on sukuk and bond issuance from the Bloomberg Professional Services database. These data include issuance dates (frequency), the amount issued, maturity, and type of issuance for each firm in the sample. New common stock issuances and quarterly accounting financials were obtained from Compustat Global database. Stock market data were generated from DataStream and ThomsonOne databases.

Empirical analysis of sukuk in the scope of corporate finance has recently received greater attention (Abdul Halim et al., 2017; Grassa and Miniaoui, 2017; Halim et al., 2019; Mohamed et al., 2014; Nagano, 2017). The existing literature tends to treat sukuk and bonds as mutually exclusive instruments by comparing between the issuers of the two instruments. Our data show that firms behaved differently; they issued bonds, equity, and sukuk simultaneously over the sample period. In this paper, we look at the change of firm preference over time as firms' degree of opacity change. We consider all funding options, including all types of sukuk, bonds, bank loans, and shares. To the best of our knowledge, the impact of opacity on sukuk issuances has not been examined before.

We find that opaque firms are more likely to issue zero-coupon sukuk, followed by conventional bonds when in need for external funds. On the contrary, transparent firms raise external funds via bank loans and shares. These findings indicate that issuing equity is the most informationally-expensive option as the corporate finance theory suggests (Myers, 1984). The features of zero-coupon sukuk attract opaque firms, as they are short-term, non-tradeable, and require minimum information disclosure compared to other funding sources (Tariq and Dar, 2007). At high opacity levels, the probability of issuing profit-loss sharing sukuk is positive but small. That can be attributed to its unpopularity and extensive contracting requirements.

We conduct several robustness checks to confirm our results. We run a multilevel multinomial ordered logistic model to verify the firms' preferences toward funding instruments. Also, we use Principal Component Analysis (PCA) as an alternative approach to constructing an opacity index.

In summary, our paper highlights that the preference for a particular capital market instrument is affected by the level of firm opacity. Therefore, firms do perceive the difference between traditional and Islamic capital markets and among Islamic instruments themselves. Moreover, the opacity of Malaysian firms is declining over time, which implies the enhancement of the Malaysian capital market infrastructure, information disclosure, regulation, and information protection.

The remainder of the paper proceeds as follows: Section 2 manifests a background on opacity and corporate capital structure followed by a literature review in Section 3. We present the econometric approach in Section 4. In Section 5, we describe our data and measures of opacity. Section 6 discusses our results. Section 7 includes robustness checks. Finally, Section 8 concludes.

II. Literature Review

In this section, we first demonstrate a brief of the Malaysian Islamic capital market. Then, we present the theoretical and empirical contributions on corporate opacity in the finance literature, as we undertake similar concepts, frameworks, and measures.

I. Malaysia

Islamic investment securities were introduced to the Malaysian market in the early 2000s. In 2006, the Malaysia International Islamic Financial Centre was established. Its goal was to promote and facilitate sukuk issuances. More than two-thirds of the listed shares in the Malaysian exchange were Sharia-compliant (by market cap) in 2011. Today, Malaysia is home of 60% of the global sukuk issuances, where the conventional and Islamic financial systems operate parallelly (Figures III.3 and III.2). The presence of foreign investors increased due to such national strategies. Tax incentives were key in such promotion. For example, profits from sukuk are tax exempted (Adesina-Uthman, 2015; Krasicka and Nowak, 2012).[8] The Malaysian corporate sukuk market is relatively cheap and cost-effective because of the high demand for Sharia-compliant products from Islamic banks and charities.

II. Opacity in the Literature

A simple definition of opacity would be the inability of the outside investors to accurately value a firm (or an asset of a firm) due to the lack of information, compared to inside managers who possess more information (Jin and Myers, 2006). Thus, opacity indicates the level of information asymmetry. However, the literature argues that opacity cannot be measured directly; therefore,

[8]The Malaysian government allows up to 70% of foreign equity participation in Islamic banks. Also, Islamic partnerships which are similar to venture capital are not considered partnerships from a tax perspective.

indirect proxies are proposed. Indirect proxies include stock- returns patterns and stock liquidity measures, which we discuss in the review below.

Investors try to infer opaque assets unobservable payoffs or information using available information and allocate funds accordingly. Neverthless, because of the complex nature of an asset (e.g. derivatives), it is difficult to comprehend its payoffs. Investors can observe the total return but not the composition of that return, which is then the source of an agency problem. Managers try to control and redirect the information gathered by investors; manipulating returns. Arora et al. (2011) show that the computational complexity of financial derivatives might amplify adverse selection between buyers and sellers and exacerbates asymmetric information problems.

Firm transparency has been a fundamental issue in corporate capital structure literature. Holmström and Tirole (1993) assert that different capital structures produce different incentives for firm information generation. They indicate that firms avoid equity issuances because it generates information that destroys firm-value, and not due to adverse selection as Myers (1984) proposes. From another preceptive, raising external capital motivates outsiders to better investigate or inspect firms. Also, raising capital externally generates information which, when combined with publicly available information, aid outsiders to assess firms better (Almazan et al., 2003).

Transparency can be beneficial. It enhances firms' image and capital allocation, which reduces agency problem and improves firms' value (Easterbrook, 1984; Holmström and Tirole, 1993). Also, transparent firms are more efficiently priced; thus, they can make better investments (Subrahmanyam and Titman, 1999). However, because the effect of bad news is more significant when compared to the effect of good news (Almazan et al., 2003), transparent firms might try to limit information revelation by issuing equity private-placements and avert underwriters.

Bharath et al. (2009) use a novel index of market microstructure measures to proxy for opacity. They apply Common Principal Analysis to decompose liquidity measures to two components: liquidity and adverse selection. The latter is used to proxy for firm transparency.[9] Similar to our paper, Bharath et al. (2009) investigate the relationship between opacity and firms' debt-equity choice. They presume that using firm characteristics to proxy for opacity is inconsistent because it is static, and it focuses on one group of insiders. They argue that the existence of better-informed investors affects stock pricing; hence, it can be observed through market microstructures measures. Their results confirm the pecking order theory that firms with higher information asymmetry have more debt issuances.

Lipson and Mortal (2006) and Gao and Zhu (2015) examine the impact of equity market liquidity on firm capital structure. They report a negative relationship between liquidity and leverage levels. Precisely, as liquidity enhances, adverse selection declines and the possibility of issuing equity increases. Also, at higher levels of information asymmetry, leverage is higher and the cost of equity is also greater.

Analysts forecasts is another opacity proxy to study information asymmetry associated with firms' debt (private and public) and equity issuances. Gomes and Phillips (2012) highlight that,

[9] Xing and Anderson (2011) use a similar approach.

conditional on raising funds publicly, firms are more likely to issue debt rather than equity. In a similar context, Denis and Mihov (2003) report that firms with a higher credit rating (high credit quality) raise funds in the public sector, while firms with medium credit quality approach banks to borrow. Firms with low credit quality borrow publicly from banks and non-bank private lenders.

Similarly, Faulkender and Petersen (2006) consider information asymmetry to be a constraint on firms external funding, that consequently affect the supply of capital. Firms that are more difficult to investigate and are facing higher levels of credit constraints are more likely to seek funds from active lenders, such as banks, rather than public debt. Drobetz et al. (2010) argue that if, higher information asymmetry motivates firms to abstain exposure and use internal funds and debt instead of equity, the value of firms' available cash shall increase as the level of information asymmetry increase. However, their results show the opposite.

Duru et al. (2013) compute the opacity index differently. They study the impact of corporate information environment on the relationship between staggered boards and firm value. In their work, opacity is a crucial moderating variable for investor protection and that corporate opacity influences the value impact of corporate governance mechanisms and firm performance. The authors argue that the impact of staggered boards on firm value is contingent on a firm's information environment. They develop an opacity proxy that captures three categories of corporate transparency: quality of corporate financial reporting, the intensity of private information acquisition and quality of information dissemination. The proxies are based on market trades, market intermediaries and analysts' forecasts. They use four opacity measures: share turnover, bid-ask spread, the number of analysts and analysts forecast error. They rank the four components into deciles with the most opaque firms assuming a value of 10 and the least opaque obtaining a value of 1. The index is then the sum of the four rankings divided by the total possible points (40). That results in a value ranging from 0.1 to 1 with a large value indicating greater corporate opacity. They verify that their proxy does capture the availability of firm-specific information to outside investors and not a proxy for firm size. They also include narrower information related variables to capture the costs for outsiders to become informed, such as firm size, leverage level, and intangibility. They include it as a complexity index in the regression in addition to the opacity index. They also document different effects of both indices. Anderson et al. (2009) use a similar opacity index to investigate the relationship between firm opaqueness and controlling shareholders types, specifically founders and heirs.

Jin and Myers (2006) establish theoretically and empirically that firm opacity can be measured by stock price synchronicity or the goodness of fit of an individual stock market model regression (R^2). Their seminal paper is based on the work of Morck et al. (2000) who show that poor investor protection and corporate governance in less developed countries cause stock price synchronicity. Jin and Myers (2006) claim that poor investor protection is not the sole driver of higher R^2. Their model differentiates between opacity and poor investor protection and shows that the former is key for higher R^2. The authors rationalize their findings as follows. Inside managers know more about firms' cash flows, thus, when cash flows are greater than outside investor expectations, firm managers tend to capture these excess funds. By doing so, managers

absorb a certain level of firm-specific risks, and investors become uninformed. Therefore, their trading is based on market factors. The previous lead to higher R^2 obtained from market models regressions. Jin and Myers (2006) also underline that the insiders' ability to absorb firm-specific risk is limited. After a long period of absorption, insiders tend to release bad news all at once causing a negative return outlier which they called "crash probability". They find R^2 to be high in less developed countries. Hence, R^2 measures the opacity of such financial systems where less information is available for outside investors. In addition, these countries have higher frequencies of negatively skewed returns. Further, different sectors have different degrees of opacity, and firms with active large trading volumes are more transparent.

The informational connection of R^2 is examined by Xing and Anderson (2011). They empirically report an inverse U-shaped relationship between information and stock price synchronicity. They argue that stock price co-movement depends on both public and private information. An increase of either information types results in higher stock price synchronicity measured by R^2. The authors verify the non-linear relationship between information and R^2 using different proxies for information, namely: (1) the annual number of voluntary managerial earnings forecasts other than the mandatory quarterly announcements, (2) PCA of voluntary disclosure, firm size and analysts coverage and (3) firms' IPO. Their results confirm the findings of Haggard et al. (2008).[10]

In a recent study, Dahiya et al. (2017) evaluate the accuracy of indirect measures of opacity. They examine the opacity of firms operating in the banking and non-banking sectors using different opacity measures organized into three categories: stock-return-based, market-microstructure-based, and analysts-based. The first category included R^2 and stock return skewness proposed by Jin and Myers (2006). The second group includes stock liquidity measures including (1) the price change per dollar of daily trading volume (AMIHUD) (Amihud, 2002), (2) trading volume, (3) effective bid-ask spread (Roll, 1984) and (4) quoted bid-ask spread. The measures in the third category are based on third-party information, such as the number of analysts following a firm, the dispersion between different analysts forecasts of firms' earnings per share (EPS) and the difference between analysts' forecast and actual values of EPS. Dahiya et al. (2017) report weak consent among measures with Amihud and the number of analysts being the most accurate.

In this paper, we measure opacity based on the above discussion. Similar to Duru et al. (2013) and Anderson et al. (2009) we construct an opacity index using eight opacity proxies proposed by Dahiya et al. (2017). How we measure opacity is discussed in detail in Section 5. In the next section, we present studies on sukuk relative to information asymmetry and capital structure.

[10] On the contrary, Dasgupta et al. (2010) theoratically report a positive relationship between stock price co-movement and transparency, Kelly (2014) document a similar conclusion empirically. According to Anderson et al. (2009), regardless of the direction of the relation, the literature shows a monotonic association between the model fit R^2 and firm opacity level, which makes the former a feasible proxy for opacity.

III. Sukuk and Firm Opacity

Early work on Islamic capital markets discusses the principles of Islamic finance and the theoretical structure of sukuk from an analytical perspective. Among others, Jobst (2007) compares Islamic investment certificates to conventional securitization instead of conventional bonds. He compares sukuk to mortgage pass-throughs, distinguishing the former by allowing the proportionate investor ownership in the underlying asset. Jobst (2007) lists features of sukuk that promote protection against information asymmetry, summed up in the following: (1) the type of asset or project generating the revenue shall be clearly identified, it cannot be debt, and shall not be consumed over the sukuk duration, (2) investors are entitled to a proportion of the asset/project ownership, (3) the transaction shall ensure the risk-return sharing between participants and that it is not based on an interest-generating debt arrangement and (4) the contribution received from investors cannot be reinvested in other short term activities. With such features, sukuk are advantageous for emerging markets as structured finance is not as popular. It can also enjoy tax exemptions and constitute a tool for investment diversification. Nevertheless, Jobst (2007) believes that emerging markets cannot exploit such benefits because they lack solid legal frameworks and standardization, in addition to poor investor protection and under-developed investor base. He also underlines the problem of light standards of transparency and disclosure requirement and the lack of data on corporate default and performance, which makes difficult for investors to assess the market. Sukuk also have high execution, administration, collection, and possible fraud costs and complex structures which increase the potential agency problem between participants.

On the merits of profit-sharing sukuk, Mirakhor and Zaidi (2007) state that sukuk protect firms against insolvency. Linking between financing and real activities achieve asset-liability management, which enhances firm financial strength. Bouslama and Lahrichi (2017) make a similar argument.

There has been an ongoing debate regarding the difference between sukuk, conventional bonds, and equity. Godlewski et al. (2013) use event analysis to investigate the reaction of the Malaysian stock market to the announcement of sukuk issuances versus conventional bonds. They claim that firms are stimulated to issue sukuk because of two reasons: first is the excess demand for sukuk from Islamic banks and other Islamic financial institutions. Second, is adverse selection. They expect firms with lower return expectations to issue sukuk preferring the profit-loss sharing arrangement. Their results show that investors reacted negatively to the announcement of sukuk issuance, while the investors' reaction to conventional bonds issuance was neutral. Therefore, investors distinguish between the two instruments. Ahmed et al. (2018) report similar findings.

The previous contention is also in line with the findings of Raei and Cakir (2007), who argue that sukuk are genuinely different from conventional bonds. They estimate and evaluate value-at-risk (VaRs) for investment portfolios comprised of sovereign conventional bonds and sukuk. They report a decline in the VaR when sovereign sukuk are added to the portfolio. Maghyereh and Awartani (2016) emphasize the diversification potential of sukuk for international investors asset allocation and hedging strategies. They compare sukuk and bonds returns and volatility

spillovers and find weak evidence of return spillovers between sukuk and bonds. Also, the difference is observable in the sukuk transmission mechanism. Smaoui et al. (2017) use a sample of 11 countries to show evidence that developed bond and stock markets facilitate sukuk issuance. Thus, sukuk and conventional funding instruments are complements and not substitutes.

On the other hand, Wilson (2008) states that practitioners tend to manipulate sukuk structure to mirror conventional bonds and thus familiarize investors with the new instrument. Therefore, the rate of return and cash flow patterns of sukuk and bonds are correlated, negating the claims that sukuk is an innovation. In a similar context, Dusuki (2010) criticizes how equity-based sukuk are executed in practice. He claims that to attract risk-averse investors, practitioners add credit enhancement strategies to the structure of PLS sukuk. By doing so, investors are offered a higher degree of protection and return predictability, transforming sukuk to a debt instrument. Using wavelet coherence and VaR analysis, Aloui et al. (2015) report no significant difference between the co-movement of sharia stocks and sukuk and the behavior of conventional stocks and bonds. Recently, Hassan et al. (2018) highlight a grey area between sukuk and conventional bonds. While sukuk maintain lower volatility during market shock, in the long run, sukuk volatility is correlated with conventional bonds.

Recently, the corporate choice between Islamic and traditional funding tools has gained considerable attention. Theoretical work by Ebrahim et al. (2014), and the empirical studies by Mohamed et al. (2014), Nagano (2017), Abdul Halim et al. (2017), and Grassa and Miniaoui (2017) argue that Islamic investment securities structure help firms mitigate information asymmetry and agency cost. We summarize these features in the following. (1) The requirement of comprehensive identification of the underlying asset which is compliant with Islamic Sharia, (2) The extensive documentation and set of contracts stating the role of sukuk-holders, managers, and originator of sukuk, in addition to the specification of asset cash flow to control for uncertainty. (3) The use of special purpose vehicles ensures the isolation of the sukuk holders from any adverse outcomes of the originator other operations and projects. Similarly, Minhat and Dzolkarnaini (2017) use firm characteristics to proxy for pecking order theory. Using a cross-sectional sample of 129 firms from 14 countries, the authors highlight that less profitable firms issue more sukuk. That is attributed to the adverse selection and the willingness of Islamic financiers to discount agency costs because of competition and limited Islamic capital market instruments.

Nagano (2017) studies sukuk issuance being an intermediate funding source between bank borrowing and issuing conventional bonds. The author based his argument on the pecking order theory and the fact that firms with higher information asymmetry issue sukuk. He uses market microstructure measures to proxy for information asymmetry and documents that firms with higher information asymmetry prefer sukuk over bank loans when the amount of financing needed is large. At the same time, he claims that sukuk are used to mitigate information asymmetry. The study uses Principal Component Analysis (PCA) to construct an index to proxy for the information asymmetry. The index includes variables such as Amihud (Amihud, 2002), stock trading volume, and bid-ask spread. Similar to our paper, Nagano (2017) computes an index

information asymmetry. However, the opacity was not the focus of his study. The index proxy for the pecking order theory and the different types of sukuk are not taken into consideration.

More recently, Nagano (2018) examines the relationship between the firms' degree of information asymmetry and the choice to issue sukuk using binary logistic models. Results show that it is possible to rank sukuk types as following: Murabaha, Ijarah and Musharaka according to the information asymmetry and firm characteristics. The author utilizes market microstructure measures such as measures of illiquidity and adverse selection such as Amihud, and bid-ask spread to proxy for information asymmetry. In a pecking order theory framework, the findings highlight a positive relationship between information asymmetry and sukuk issuances in the case of substantial and long-term funding requirement. The author interpreted the absence of a significant relationship between information asymmetry and Murabaha sukuk as an indication of the low information asymmetry associated with such sukuk contracts. Abdul Halim et al. (2017), on the other hand, use information asymmetry as a control variable when testing agency cost problem, they use firm characteristics as a proxy. They find no relationship between firm funding preferences and information asymmetry. Both attempts analyse information asymmetry between managers and outside investors and test groups of sukuk issuers against bond issuers.

Klein and Weill (2016) also use firm characteristics to measure adverse selection and the moral hazard of the firm issuing sukuk. They argue that the existence of SPVs in sukuk structure motivates managers to move troubled projects from the originator books and transfer the risk to other stakeholders, namely the sukuk holders. By doing so, the managers have no incentive to monitor or maintain the performance of that project as long as it does not affect the originator. However, that still depends on the sukuk structure. The previous argument is supported by Klein et al. (2018) who also argue that the complex contracting of sukuk structures complicates the understanding of parties rights, especially in the case of financial distress and liquidation. While sukuk theoretically claim the isolation between sukuk originator and the parent firm, recent cases of sukuk defaults negate such claim. Sukuk is considered to be a weak tool to discipline managers and mitigate the moral hazard, because evidence show that sukuk-issuing firms tend to choose low-return investments (Klein and Weill, 2016).

The above discussion can be expanded to elicit other motives for firms to hide information by issuing sukuk. The structural and legal complexity of sukuk investors might need professional assistance in order to understand the natures of the issuance. That is specifically true as the disclosure requirements of sukuk are not standardized yet. Issuing PLS sukuk involves a higher degree of information revelation because, in such sukuk, a firm acts as a partner which will require providing more information to the potential sukuk holders. The latter indicates higher degrees of market exposure and transparency. At the same time, because of the partnership arrangement, PLS sukuk involve higher adverse selection. On the other hand, the issuance of fixed-income (FI) sukuk can signal that firms attempt to settle for the closest alternative to conventional bonds. In most cases, this type of sukuk involve the lease or the sale and repurchase of a certain asset, a chance for the firms to take a troubled asset outside the balance sheet (Klein and Weill, 2016).

In this paper, our objective is to investigate the impact of the different informational requirements of sukuk types on the decision of being selected to raise funds externally when other options are available. Thus, we take into consideration all sukuk structures. We classify sukuk into three categories: (1) profit-los sharing (PLS) sukuk which has more equity characteristics; (2) fixed-income sukuk (FIS) or debt-like sukuk, and (3) zero-coupon sukuk (ZCS), which are debt-like but not tradeable as they constitute a direct debt. We do not adopt any capital structure theory, but we directly measure Malaysian firms' opacity using an index comprised of stock price co-movement and market microstructure measures. Based on the above discussion, we test the following hypotheses:

$H_{0\ 2}$: Opaque firms do not issue sukuk because of the required extensive documentation and information disclosure.

$H_{0\ 1}$: Firms perceive identical transparency requirements in all sukuk types.

In the next section, we present our econometric approach.

III. Econometric Approach

We use a multilevel multinomial logit model with panel data to investigate the impact of firm opacity on the external funding decision. Scholars such as De Haan and Hinloopen (2003), Denis and Mihov (2003), Huang and Ritter (2009),Kayo and Kimura (2011) and Helwege and Liang (1996) use multinomial logit models to examine firms' capital structure decisions.

Multilevel (also called mixed-effects or hierarchical) models assume that lower-level features are nested within the higher-level features (Luke, 2004; Powers and Xie, 2008). Specifically, it is logical to think that observations of firms operating in the same sector are correlated as they are uniformly regulated and encounter similar conditions. However, firms' behaviour between sectors varies. Similarly, observations occurring across time are also correlated once they belong to a particular firm. Failing to specify the level at which relationships occur leads to inference fallacies and problems (Luke, 2004). Such models rationalize the correlation of residuals across levels. Compared to panel data models, multilevel models produce enhanced outcomes because they consider both the variation between and within entities (Cameron and Miller, 2015*a*). Figures II.4 and II.5 show how the frequency of issuing sukuk varies between and within time periods, firms, and sectors. The graphs provide statistical evidence supporting our decision to use multilevel models. According to Gelman (2006), mixed-effect models produce more accurate and adequate analysis. Kayo and Kimura (2011) use hierarchical linear modeling to examine the capital structure of firms operating in different industries in 40 countries. They stress the role of the characteristics of each level on firm funding decisions. They criticize the use of dummy variables to represent levels or sub-levels because that is a classification activity rather than level characterization.

We specify the three-level and two-level models with random intercepts as in Equations II.1 and II.2. We identify three levels in our data; sector, firm, and time (Figure II.3). Mixed-level models

allow entities to vary due to random effects caused by level-specific factors while controlling for fixed effects at the same time.

$$y_{it} = \alpha_{it} + \beta OPAC_{it} + \gamma \sum_{k=1}^{K} X_{kit} + e_i^{(2)} + u_{it} \tag{II.1}$$

$$y_{itj} = \alpha_{itj} + \beta OPAC_{itj} + \gamma \sum_{k=1}^{K} X_{kitj} + e_i^{(2)} + e_j^{(3)} + u_{itj} \tag{II.2}$$

where $OPAC_{it}$ is the opacity index at time t for firm i, operating in industry j. The term $\sum_{k=1}^{K} X_{kit}$ includes k lagged firm characteristics such as firm size, tangibility, solvency, and profitability. Equation II.1 is a two-level mixed-effects model which assumes that observations are nested within firms. Therefore $e_i^{(2)}$ is the random intercept of firms, and u_{it} is the idiosyncratic residual specific to each observation of each firm. Equation II.2 assumes that the dataset has three levels of clusters, sector, firm, and time observations. Hence $e_j^{(3)}$ is the random intercept of the sector and u_{itj} is the idiosyncratic residual specific to each observation in each firm in each sector. Finally, y_{it} is a multinomial dependent variable coded for external funding instruments. It takes value from 1 to 6 when a firm issue conventional bonds, PLS sukuk, FI sukuk, zero-coupon sukuk, shares, and bank loans, respectively. It is formally defined as follows:

$$y_{it} = \begin{cases} 1 & \text{Bonds} \\ 2 & \text{PLS Sukuk} \\ 3 & \text{FI Sukuk} \\ 4 & \text{ZC Sukuk} \\ 5 & \text{Equity shares} \\ 6 & \text{Bank Loans} \end{cases} \tag{II.3}$$

We estimate the model using a generalized structural equation model (GSEM) which applies maximum likelihood estimation procedure. It allows for multilevel multinomial logistic and probit specifications. Also, it does not drop observations when some values are missing. The GSEM also facilitates comparing groups (Acock et al., 2013; Bartus, 2017; Goldstein, 1986; Rabe-Hesketh and Skrondal, 2008; Rabe-Hesketh et al., 2004; Wooldridge, 2010). Chang et al. (2009) assert that structural equation models help researchers overcome problems encountered when using OLS regressions such as measurement errors, multicollinearity in explanatory variables and violations in the assumptions in the error term. Further, it facilitates the use of one or more observable variables to measure an unobservable theoretical attribute (latent variable)

without causing collinearity problem (Krull and MacKinnon, 2001; Schumacker and Lomax, 2016; Skrondal and Rabe-Hesketh, 2003).[11]

The Independence of Irrelevance Assumption (IIA) test states that the categories represented by a multinomial variable should be alternatives and not substitutes (Long and Freese, 2006).[12] The test shows that the six categories defined in the dependent variable are significantly distinguishable and shall not be combined. This finding supports our argument of the importance of differentiating between sukuk types according to their structure. Firms' perception of such differences is one aspect we are examining in our research. Further, the Hausman test and seemingly-unrelated-estimation-based Hausman test showed significant evidence that regressions outputs are independent of each other. We also report that all explanatory variables significantly affect the funding choice at the 1% significance level.

IV. Data

I. Sample

The econometric model demonstrated above requires three sets of information. First, the frequency of using or issuing each Islamic and conventional external funds, which is the dependent variable. That includes the three types of sukuk (PLS, FI, and Zero-coupon), conventional bonds, bank loans, and equity. Second, our primary explanatory variable is the opacity index, which we discuss its component later in this section. Third and last are control variables such as firm characteristics and macroeconomic variables.

Our data consists of 107 Malaysian firms operating in 10 sectors (Table II.2). We use Bloomberg to obtain our sukuk dataset, which comprises 3,763 corporate sukuk issuances, including all outstanding and matured sukuk. 399 firms issued sukuk at least once, while the total number of issuances per firm range from 1 to 121 issuances. 54 per cent of total companies issued sukuk once to five times. If the range extended to a maximum of 10 issuances, that would include 71% of companies (285 companies). 114 companies or 28.5% of the Malaysian companies wrote more than ten issuances over their operating duration.

We filter the dataset for financial, private and government-owned firms that resulted in 107 companies with 1,406 issuances. Since a considerable number of firms issued sukuk more than once in a specific quarter, values of issuances were summed and duration was averaged. The former approach was the most appropriate to obtain one observation per quarter without forfeiting information. The compressed number of issuances is 359. Firms in the sample operate in 10 sectors. Industrial firms dominate the sample. The technology sector has the lowest number of firms, but it is the largest in terms of size sector, followed by utilities. The frequency of sukuk

[11] We use STATA to perform all estimations. The most recent version of STATA does not have a command to estimate panel multilevel multinomial models. However, the STATA's Generalized Structural Equation Model ling allows for writing and running a broad array of estimations not specific to structural equation models. It is allows for single and multilevel data, mixed, random and nested effects, in addition to latent variables.

[12] Although Long and Freese (2006) criticize the consistency of the IIA test, we run it for diagnostic purposes.

issuances was the highest during the 2008–2009 sub-prime crisis. However, the amount issued is small compared to later periods (Table II.2).

We use the same approach to account for bonds and shares issuances and bank loans. The total number of bond issuances is 98, compared to 702 share issuances and 1805 bank loans. The frequency of issuing sukuk is greater than bonds (Figure II.6). However, sectoral differences show that issuing bonds is minimal in sectors such as healthcare, consumer discretionary and consumer staples, while the difference between the volume of conventional bonds and sukuk issuances is small in industrial firms. Issuing equity is the highest (in terms of frequency) in all firms in all sectors. On average, the volume of equity issuances increased between the fourth quarter of 2011 to the end of 2015. A 5% increase in long term debt is considered a bank loan extension. Bank loans have a positive trend throughout the sample. Tables II.1 and II.2 exhibit the frequencies of using each funding source.

For the control variables, we collect firms' financial information from Compustat to compute firm-characteristics such as firm size, leverage, solvency, profitability, tangibility, liquidity, and new investment opportunities. Definitions of variables are illustrated in Table II.3. Opacity index is our main explanatory variable. We construct the index using eight indirect opacity proxies. We present the proxies, their computation, and data sources in section II. Tables II.5 to II.8 in the Appendix give descriptive statistics and correlation matrices of all variables.

II. Measuring Opacity

The objective of this paper is to investigate whether sukuk information requirements induce transparency and affect capital structure decisions. Therefore, finding an accurate measure of opacity is crucial. We follow Anderson et al. (2009) and Duru et al. (2013) to construct an opacity index consisting of opacity proxies organized in two groups as proposed by Dahiya et al. (2017).

To construct the index, we use eight indirect opacity measures explained below. We rank them into deciles with the most opaque firms recieving a value of 10 and the least opaque obtaining a value of 1. We then sum up the deciles for each quarter and divide by the total possible points, which are 80. That generates an index with values ranging from 0.1 to 1, values closer to 1 indicate greater corporate opacity.[13] In this section, we discuss the opacity index components. Measures computation require data such as stock prices, trading volume, bid and ask prices which we obtain from DataStream.

The first category of measures is stock-return-based, which includes stock return synchronicity (R^2) and skewness of residual returns. Conforming to Jin and Myers (2006), R^2 is the goodness of fit obtained from a regression model of individual stock returns. The argument is that a stock with high R^2 is largely influenced by the market rather than by firm-specific factors. Jin

[13]In the robustness checks section we use principal component analysis (PCA) to produce opacity index as in Bharath et al. (2009) and Gao and Zhu (2015). We show that PCA is not able to capture commonality of the adverse selection component embedded in liquidity measures. We attribute the results to the difference between the U.S. and emerging capital markets due to factors such as the degree of development, size, and regulations.

and Myers (2006) conclude that opacity and low investor protection cause a high R^2. Precisely, when a firm's cash flow is greater than investors' expectations, insider managers capture part of that cash flow. That, combined with a higher degree of opacity, leads to a decline in the firm-specific risk borne by investors, resulting in a greater R^2. Chan et al. (2013) state that when a firm is highly correlated to the market, its price adjustments are less related to its firm characteristics; hence, market players can infer information from its market movement. Jin and Myers (2006) use an expanded market model regression to obtain R^2 as their analysis is cross-country. We follow Dahiya et al. (2017) and use a standard Fama-French-Carhart four-factor model to obtain R^2 (Equation IV.1). Consequently, the natural logarithm of R^2 is used to measure the synchronicity of firm stock returns with the market as shown in Equation (IV.2).

$$r_{i,t} = \alpha_{i,t} + \beta_{1i,k} MKT_{t+k} + \beta_{2i,k} SMB_{t+k} + \beta_{3i,k} HML_{t+k} + \beta_{4i,k} UMD_{t+k} + \epsilon_{i,t} \tag{II.4}$$

$$\ln\left(R^2\right) = \ln\left(\frac{R^2}{1 - R^2}\right) \tag{II.5}$$

where $r_{i,t}$ is the return in excess of the risk-free return for stock i at time t. MKT is the excess return on an average weighted aggregate market proxy. SMB, HML and UMD are returns for size, value and momentum factors respectively. We use the factors Fama-French calculated for Asian-Pacific countries published on their online data library (French, 2013). Although Malaysia is not included in the calculation, it is the closest proxy.

The second measure is the likelihood of a crash or the asymmetry of equity returns. The literature (Hutton et al., 2009; Jin and Myers, 2006) suggests that, when shareholders know less about generated cash flows, it is optimal for managers to distribute a fixed fraction of that cash flow to outside shareholders. Thus, managers are willing to absorb some of the firm-specific volatility to be able to seize a larger fraction of cash flows in cases of favourable volatility. However, managers are only able to absorb a limited amount of adverse firm events. Beyond a certain point, the accumulated negative information is released, resulting in a crash. Opacity is then associated with a higher crash probability. The skewness of the stock returns residuals generated from the Fama-French-Carhart four-factor (Equation IV.1) measures the probability of a crash.

The second category of opacity proxies is market microstructure measures, which include six variables. It is based on the theoretical foundation that stock prices covey information from those who know (informed) to those without information (uninformed) (Easley and O'hara, 1987; Grossman and Stiglitz, 1980; Kyle, 1985). Investors deem opaque firm to be of higher risk as some information is hidden or unattainable. Consequently, investors are hesitant to trade the shares of such firms, which reduces their liquidity. An accepted and straightforward measure is the price-measure-impact developed by Amihud (2002). Its simplicity, however, does not affect its effectiveness compared to other measures (Dahiya et al., 2017). It is a measure of illiquidity represented by the price impact of stocks order flow. It measures the price change per dollar of the daily trading volume. Because of information asymmetry and the effect of

private information, illiquidity is positively associated with opacity, resulting in a higher value of Amihud. It is computed as follows:

$$Amihud = \left(\frac{1}{D_i}\right) \sum_{t=1}^{D_i} \frac{\mid r_{it} \mid}{V_{it}} \tag{II.6}$$

Where D_i is the number of days for stock i during a year. $VOL_{i,t}$ is the volume of stock i on day t.

Amivest is the second market microstructure measure, which has a similar concept to Amihud. It produces the number of shares that should be traded in order for the stock price to increase or decrease by 1%. A large number of shares indicate illiquidity, hence, less transparency (Amihud et al., 1997; Berkman and Eleswarapu, 1998; Cooper et al., 1985). We compute it as the following:

$$Amivest = \frac{P_{it} V_{it}}{\Sigma \mid \%\Delta P_{it} \mid} \tag{II.7}$$

Where P_{it} is the daily stock price.

The third measure is the volume-return coefficient proposed by Llorente et al. (2002) when they investigated the relationship between information asymmetry and stock returns. They argue that future returns can be forecasted using the current period return and trading volume as shown in Equation II.8 and that C_2 can proxy for opacity if it is a function of a liquidity proxy such as market capitalization or bid-ask spread.

$$r_{it+1} = C_0 + C_{1i}.r_{it} + C_{2i}.V_{it}r_{it} + \upsilon_{it+1} \tag{II.8}$$

Trading volume, quoted and effective bid-ask spread are the remaining microstructure measures. Trading volume is the natural logarithm of the average daily dollar volume during a quarter (Anderson et al., 2009; Duru et al., 2013; Leuz and Verrecchia, 2000; Lo et al., 2004). The quoted bid-ask spread is computed as the difference between the ask and bid prices divided by the average of the two prices. Effective bid-ask spread is calculated as $spread = 2\sqrt{-cov_{it}}$, where cov_{it} is the first-order serial covariance of stock return as proposed by Roll (1984).[14] All proxies are expected to measure information asymmetry among investors (Anderson et al., 2009; Diamond and Verrecchia, 1991; Duru et al., 2013). Table II.4 exhibits a summary of the opacity index components.

V. Results and Discussion

I. Univariate Analysis

In this section, we graphically present a univariate analysis of the opacity index and its components relative to the frequency of using external funds and firm characteristics. Figure II.7

[14] Roll (1984) propose the computation of effective bid-ask spread under the assumption of an informationally efficient market. We include it for completeness.

illustrates the relationship between the opacity index and the frequency of using external funding sources. We notice that opacity levels decrease over time in all sectors expect for the utility sector, in which the average opacity index increase over time. That indicates the improvement of regulations, disclosure, capital markets infrastructure and investor protection in emerging markets such as Malaysia.

Figure II.7 shows that, when opacity is high, the frequency of issuing shares and zero-coupon sukuk is the highest. That is followed by issuing bonds and with lower frequency followed by fixed income sukuk. The issuance of PLS sukuk is low when opacity is high. The previous is found to be persistent even when the components of the index calculated using Islamic capital market data.

Figures II.8 to II.11 show the relationship between each indirect opacity measure to the different capital funding instruments. The measures show some degree of consistency. In six of the eight variables, the issuance of equity and zero-coupon sukuk is associated with a higher opacity. In Figure II.8, we illustrate that at higher-than-average values of R^2, the frequency of issuing all types of funding sources is relatively the same. However, at substantial values (higher opacity), the frequency of issuing FIS, bonds, and equity is the highest. We can also notice that, when opacity is low (lower R^2), the frequency of issuing shares is still the highest. Extremely negative residual returns indicate a higher probability of a crash, according to Jin and Myers (2006). Our data show that in such cases, the frequency of issuing equity, FIS, and PLS are high. Skewness reaches lower points in periods such as the global financial crisis. Healthcare and technology sectors reach lower skewness points than other sectors.

In Figure II.9, low Amihud imply low opacity. In such a case, shares and PLS issuances are the highest. As Amihud increases, firms issue more equity shares and zero-coupon sukuk. Amivest is another version of Amihud, it measures liquidity by calculating the dollar volume required to move a stock price 1% upward or downward. Therefore, larger Amivest is associated with lower liquidity. Our data show that at high values of Amivest, Malaysian firms issued shares and fixed income sukuk. On average, Amihud is below 0.5 except for the sub-prime crisis period when it peaked. The sector analysis shows that consumer discretionary, healthcare and technology sectors record higher overall Amihud.

Liquid firms have larger trading volumes (Figure II.10). Our data show that at low trading volumes, the frequency of using equity shares, bonds, and zero-coupon sukuk is higher compared to other funding sources. Interestingly, the number of bond issuances decrease as liquidity enhances. PLS sukuk, however, have the lowest issuance frequency. A high positive average volume-return coefficient indicates high information asymmetry. At large positive coefficients, the frequency of using zero-coupon sukuk is large, while at larger values, the issuances of FIS, conventional bonds, and equity shares are the highest. The sector analysis shows that overall trading volume is the same among sectors. However, it is lower in consumer discretionary and healthcare sectors. Trading volume is more volatile in healthcare and technology. This is relatively in line with AMIHUD sector analysis.

At large effective and quoted bid-ask spreads (higher opacity) the frequency of using zero-coupon sukuk is larger compared to other resources (Figure II.11). At low bid-ask spreads, the frequency of issuing conventional bonds and equity shares is higher. The bid-ask spread per sector indicates a constant spread around zero for most sectors. However, the spread is relatively higher in the energy sector, and it is volatile in some sectors such as consumer discretionary and healthcare. The spread is negative in the utilities sector.

We also find a negative relationship between firm size and opacity index, implying that small firms are less transparent. High leverage ratios are associated with high opacity levels when measured by market leverage ratio. We find a similar relationship between opacity and firm solvency. The latter indicate that solvent firms are more opaque compared to those with higher bankruptcy probability. Opposite to Almazan et al. (2003), we observe a positive relationship between transparency and firm value. That is, transparency is associated with higher firm values (Figure II.12). Finally, Figure II.13 demonstrates the duration and amount issued via each instrument over the sample period. Majority of bonds, fixed income, and PLS sukuk issuances are long term. Zero-coupon sukuk are used to raise smaller amounts in the short and medium-term.

II. Inference and Discussion

Both two-level and three-level regressions show a significant relationship between opacity levels and the choice of external funding. Coefficients in Table II.9 highlight our main finding. All else being equal, opaque Malaysian firms are more likely to issue zero coupon sukuk than conventional bonds (base category). However, firms are significantly less likely to issue to fixed-income sukuk, equity shares, and bank loans compared to conventional bonds. We also find that firm size, tangibility, and solvency affect opacity levels.

Williams (2012) indicates that using marginal effects to interpret categorical variables makes results more tangible. That is done by computing the predicted probabilities of success for each category with specific characteristics. Quoting Cameron and Trivedi (2010) "marginal effects represent the effect on the conditional mean of y of a change in one of the regressors, say, x_js". Therefore, we compute marginal effects or the average probabilities of issuing each funding source at different opacity levels and data averages, as shown in Figures II.14, II.15, and II.16.

Marginal effects highlight that the probability of issuing zero-coupon sukuk is almost zero when the opacity index is relatively low (OPAC < 0.5). However, as opacity increases (OPAC > 0.5), the issuance of zero-coupon sukuk has a probability of almost 1. The issuances of conventional bonds and PLS sukuk increase as well but with lower probabilities. Fixed income sukuk issuance noticeably decreases as opacity levels increase. The probability of issuing shares is negative at all opacity levels. At high opacity levels, the probability of using bank loans is negative (Figures II.14, II.16). Figure II.15 shows the average marginal effects at different opacity levels where patterns are pronounced with reasonable clarity. Higher opacity is associated with more zero-coupon sukuk issuances and fewer share issuances. The issuance of conventional bonds and PLS

increase as well but with lower probabilities. Fixed income sukuk issuance slightly decreases as opacity levels increase.

The previous findings indicate that opaque firms prefer Islamic investment certificates. Specifically, zero-coupon sukuk is by far the most favorable funding tool for opaque firms, followed by PLS sukuk. Therefore, we reject our hypothesis that opaque firms do not issue sukuk due to the transparency and extensive disclosure requirements. However, transparent firms do issue FI sukuk but with small probabilities. Hence, we can conclude that the transparency requirements for FI sukuk are stricter compared to PLS and zero-coupon. Our second hypothesis is then automatically answered. The informational environment varies across sukuk types. Interestingly, market perception of PLS sukuk is opposite to theory. The equity characteristics of PLS sukuk does not seem to have a discernible effect. Results show that PLS sukuk requirements are similar to those of zero-coupon sukuk and conventional bonds.

The impact of firm opacity on external funding sources is affected by other variables such as firm size, tangibility, leverage, new investment opportunities, and performance. We divide the Malaysian firms into three size categories; small (bottom 25^{th} of the distribution of the natural logarithm of total assets), medium (between the 25^{th} and 75^{th} percentiles) and large (top 75^{th} percentile) . We examine the relationship between opacity and funding sources for each category (Figure II.17). Opaque small firms prefer to issue zero-coupon sukuk (P=93.9%), while transparent firms obtain bank loans. Transparent medium firms seek bank loans as well, but they issue zero coupon (P=31.2%) and fixed income sukuk (P=8%) when opaque. Finally, large firms issue conventional bonds (P=27.3%) at high opacity levels. The probability of issuing equity is positive at low opacity levels and continues to increase until it drops at opacity index = 0.8. The findings show that small and medium opaque firms are the main issuers of zero-coupon sukuk, while they are not an option for larger firms.

Our results document a different impact of opacity at different leverage levels. We use two leverage measures; book and market leverage ratios. Figure II.18 show graphical representation of marginal effects.[15] Low-leverage firms (between 0 - 15.4% of total assets) are more likely to issue zero-coupon (P=20%) and PLS (P=14.7%) sukuk at higher levels of opacity. As in earlier cases, the probability of obtaining bank loans is negatively associated with opacity. Opaque medium leveraged firms issue zero coupon sukuk with 45% probability. The probability of issuing conventional bonds and PLS sukuk are positive but small (3.6% and 4.7% respectively). High-leverage firms issue zero coupon with 58% chance. The second funding preference is conventional bonds with 33% probability. In general, higher opacity is associated with higher leverage and the issuance of zero-coupon sukuk.

We consider Almazan et al. (2003) argument about the relationship between transparency, capital structure, firm value, and the net present value (NPV) of new investments. We report a positive association between Malaysian firms value and transparency (Figure II.19). All changes in firm value lead to a greater probability of using bank loans when transparent and issuing

[15] We show marginal effects for leverage measured by market leverage only as using book leverage generated identical marginal effects.

zero-coupon sukuk when opaque. A negative change in firm value leads to higher sukuk issuance probability (P=64%). Second, funding preferences are also affected by the change in firm value. The second funding preference for firms that experienced an increase in firm value is PLS sukuk, while firms with a decreased firm value preferred conventional bonds.

Opaque firms with negative investment opportunities prefer to raise capital externally via mainly zero-coupon sukuk. They also issue FIS and conventional bonds with comparable probabilities. Firms with positive investment opportunities prefer to issue zero coupon sukuk only (Figure II.20).

We also examine firm performance and its impact on opacity and the choice of funding source. We measure firm performance using the return on assets (ROA) and return on equity (ROE) ratios. Profitable and non-profitable opaque firms prefer to raise funds through zero-coupon sukuk. Troubled firms are more likely to use this type of sukuk with 78% probability. Profitable firms' second funding option is conventional bonds. Troubled firms' second option is FI sukuk (Figure II.21).[16]

Simulating the methods used in existing literature, we combine sukuk categories and re-estimate the model. Specifically, we ignore sukuk type characteristics and combine them in a single category. We report a significant relationship between opacity levels and the external funding source. We find that as the opacity index increase, the probability of firms issuing sukuk is the highest followed by issuing conventional bonds. The probability of issuing equity is negatively associated with opacity. Therefore, the average marginal effects of sukuk are dominated by the marginal effects of zero-coupon sukuk.

Control variables show similar results when we combine sukuk categories. Opaque low-leverage firms prefer to issue sukuk and conventional bonds. As opacity increases the probability of using bank loans decreases. Medium-leveraged firms have a stronger preference for sukuk.

We estimate a three-level and two-level mixed models. The first model assumes that observations are nested within firms and firms are nested within sectors. The latter model assumes that observations are nested within firms only. Variances reported in Table II.14 verify sector and firm nesting assumptions. The sector plays a greater role in determining capital structure source. The variance of firm-level is small. However, it is important to show the role of sector variance. The information criterion test (AIC) (Akaike, 1998; Schwarz et al., 1978) is the lowest for the three-level model. Hence, the three-level model better serves the purpose of our paper.

We can summarize our findings as follows: (1) Our main finding is that opaque firms are more likely to issue zero-coupon sukuk followed by conventional bonds when in need of external funds. On the contrary, transparent firms raise external funds via bank loans and shares. The previous indicate that issuing equity is the most informationally expensive as the theory suggest. Also, the features of zero-coupon sukuk attract opaque firms. Such sukuk are short-term, non-tradeable, and requires minimum information disclosure compared to other funding sources. At high opacity levels, the probability of issuing PLS is positive but small. That can be attributed

[16]We show marginal effects for profitability measured by ROA only as using ROE generate identical marginal effects.

to its unpopularity and extensive contracting requirements. (2) Therefore, the preference to a particular capital market instrument is affected by the level of firm opacity, and (3) firms do perceive the difference between traditional and Islamic capital markets and among Islamic instruments themselves. (4) We also find that the opacity of Malaysian firms declined over time, which implies the enhancement of the Malaysian capital market infrastructure, information disclosure, regulation, and information protection.

Results highlight that information cost is different for each type of sukuk. As mentioned above, opaque firms tend to prefer zero-coupon sukuk to limit information disclosure. We also observe an association between preference to issue zero coupon sukuk, conventional bonds, and PLS sukuk. The previous findings negate the claim that PLS sukuk has more equity characteristics. Our results show that all sukuk types do not share characteristics with equity or shares.

VI. Robustness Checks

In this section, we conduct several robustness checks. We first test the funding options of opaque firms we obtained earlier. Therefore, we rank the external funding sources according to our findings in the previous section, and run a multilevel multinomial ordered logistic model. Next, we examine if there is a relationship between stock price synchronicity and liquidity that can affect our opacity measure. Finally, we use alternatives measures of opacity. For example, we use Principal Component Analysis (PCA) as an alternative method to construct the opacity index.

I. Multilevel Multinomial Ordered Logistic Model

To confirm our findings, we re-estimate our model by running an ordered logistic regression where we define an order for firm preference toward external capital sources. We redefine the dependent variable ($y_{olog_{it}}$) to take values 1 to 6, with 1 indicating the most favorable funding source and 6 being the last choice. According to our findings presented in the previous section as opacity levels increase, firms' funding preferences are as follows:

$$y_{olog_{it}} = \begin{cases} 1 & \text{ZC Sukuk} \\ 2 & \text{Bonds} \\ 3 & \text{PLS Sukuk} \\ 4 & \text{FI Sukuk} \\ 5 & \text{Bank Loans} \\ 6 & \text{Equity shares} \end{cases} \tag{II.9}$$

We estimate the two-level and three-level ordered logit models with the same opacity index and control variables:

$$y_{olog_{it}} = \alpha_{it} + \beta_1 OPAC_{it} + \sum_{k=1}^{K} \beta_k X_{kit} + e_i^{(2)} + u_{it} \tag{II.10}$$

$$y_{olog_{itj}} = \alpha_{itj} + \beta_1 OPAC_{itj} + \sum_{i=1}^{K} \beta X_{kitj} + e_i^{(2)} + e_j^{(3)} + u_{itj} \tag{II.11}$$

The above estimations significantly confirm Malaysian opaque firms preference toward zero-coupon sukuk and conventional bonds. The order of PLS and fixed income sukuk have interchanged. The probability of issuing equity is negative, implying that it is the least favourable funding source as transparency levels decrease (Figures II.22 and II.23). However, ordered logit report that variation due to firm-specific characteristics is higher than that of sector characteristics.

II. The effect of stock price synchronicity on liquidity

In this section, we acknowledge the relationship between stock price synchronicity and liquidity documented by Chan et al. (2013). They highlight that stock price synchronicity measured by R^2 have a negative and significant impact on liquidity. Their study is based on all NYSE-listed firms, and they find no evidence of reverse causality between opacity and stock price synchronicity. They assess liquidity using three measures: effective bid-ask spread; Amihud and Kyles' price impact measure. They argue that their finding depends on information asymmetry magnitude. Other scholars, who demonstrate a relationship between stock return co-movement and liquidity, include Baruch et al. (2007) and Baruch and Saar (2006).

We break down the opacity index into its components and run two regressions; one with R^2 as a sole opacity measure, and the other using liquidity measures to proxy for opacity. The latter is an index which includes six liquidity measures: effective and quoted bid-ask spread; trading volume; Amihud; Amivest, and the volume-return coefficient. We find that zero-coupon sukuk and conventional bonds are positively and significantly associated with opacity levels, while other funding tools report negative signs. When using R^2, as the opacity proxy, significance, and signs of external funding changed except for the zero-coupon sukuk and bank loans. The magnitude of the marginal effects decreases considerably to reach zero probability.

The above observations show that microstructure variables play a greater role in measuring opacity than stock price synchronicity and that each reflects a different opacity dimension.

III. An alternative opacity index

Principal Component Analysis (PCA) Based Opacity Index

The commonality in liquidity is documented in studies such as Chordia et al. (2000); Domowitz et al. (2005); Korajczyk and Sadka (2008) and Karolyi et al. (2012). They argue that there are common factors that cause liquidity. Adopting such a view, studies as Bharath et al. (2009) and

Gao and Zhu (2015) use Principal Component Analysis (PCA) to extract liquidity measures common factor and use it as a proxy for opacity. Both studies use four liquidity measures: effective and quoted bid-ask spread, Amihud and information based-trading. Likewise, we use the first principal component of four liquidity measures, but we replace information based-trading with trading volume.[17] The first factor represents approximately 40% of the commonality.

We use the same control variables and estimation methodology to obtain regression coefficients and marginal effects. Results underline different association between opacity and capital structure sources preferences. Only marginal effects of conventional bonds were found to be significant. If we ignore significance levels, the findings show that as opacity increases firms prefer to issue conventional bonds and zero-coupon sukuk. However, the probability of issuing zero-coupon sukuk is lower, compared to our main findings. Similar to our findings, there is a negative association between opacity levels and issuing fixed-income sukuk and shares (Figures II.24).

Nevertheless, ignoring significance levels, the marginal effects obtained from the model with the PCA index, have close signs (but not magnitude) to the decile opacity index. The inability of replicating our findings using a principal component analysis can be attributed to two reasons. First, previous studies which applied the same approach were conducted on American and European firms. Compared to an emerging market such as Malaysia, stock markets in the U.S. and Europe are more developed with solid infrastructure which produces more accurate market microstructure, trading, and liquidity measures. Second, this can be an indication of the importance of other variables (liquidity and stock return synchronicity measures) which were ignored by this approach because of the absence of a common factor.

Indirect Measures of Opacity

We use each of the eight opacity index components, individually to proxy for firm opacity. We confirm the findings documented by Dahiya et al. (2017). Each measure produces a different association between opacity and the source of external funding. Six of the eight measures agreed that as opacity increases, the probability of issuing conventional bonds increase and the probability of issuing fixed-income sukuk decrease. While five measures show that there is a positive association between opacity and the issuance of profit-loss sharing sukuk. Only 50% of measures confirm that opacity has a positive impact on the issuance of zero-coupon sukuk and a negative impact on obtaining bank loans. Opposite to our findings, five measures report a positive association between opacity and issuing shares. The previous stress on the fact that each measure reflects another dimension of opacity.

[17] Information based trading is obtained from the signed order flow of the buying and selling of firm's stocks, which was part of a model developed by Easley, Kiefer and O'Hara (1996); Easley et al. (1997*a*,*b*); Easley, Kiefer, O'Hara and Paperman (1996). However, such information was not attainable at the time we conducted this paper.

VII. Conclusions

Islamic finance principles call for ethical transacting and linking financing activities with real economic growth. It is making its way in sustainable development national plans. Some countries are undertaking legal and regulatory reforms to endorse Islamic finance practices within the mainstream system. Therefore, it is vital for regulators, practitioners, and investors to understand the mechanisms of its operations and evaluate how principles are enforced in practice. Our findings suggest that the choice of funding source reflect the firms opacity level. For example, firms issuing zero-coupon sukuk have higher opacity levels, hence, require more supervision. This paper also underlines that beside religion, opacity has a significant role in the decision to issue the different sukuk types.

In this chapter, we examine the informational sensitivity of Islamic investment certificates (sukuk) by investigating the relationship between firm opacity and the preference to issue sukuk in Malaysia. Proponents of Islamic Finance argue that Islamic investment certificates (sukuk) require higher degrees of information disclosure, extensive contracting and involve less uncertainty, thus promoting transacting transparency. Recently, however, scholars argue that the structure of these certificates can be manipulated by managers to obscure some firm information. In this paper, we investigate both views by examining the information environment associated with the choice of external funding instrument.

We construct an opacity index following Anderson et al. (2009) and Duru et al. (2013). We use eight indirect opacity measures organized into two categories (Dahiya et al., 2017); stock-returns-based (Jin and Myers, 2006) and market-microstructure-based. To investigate the impact of opacity on the choice of external funding choice, we apply a three-level and two-level mixed-level multinomial logistic model.

Our generated results convey essential implications for academics, policymakers, investors and issuers. The significant relationship between firm opacity and sukuk issuance suggest the presence of motives other than religion to issue sukuk. Also, the preference for a particular capital market instrument is affected by the level of firm opacity. Hence, our paper verifies another dimension to the characteristics of sukuk contracts. It adds depth to the understanding of the structure of sukuk and its features, especially to non-Muslim investors and issuers. Therefore, exploring and identifying such non-religion incentives to issue sukuk and providing empirical evidence of its characteristics improve the reachability and globalization of the Islamic finance industry.

The results show that in terms of transparency, the structure of sukuk is not superior to the traditional instruments as theoretically claimed. We report that opaque firms are more likely to issue zero-coupon sukuk followed by conventional bonds. Profit-loss-sharing sukuk, which in theory are the most transparent, have a small, positive, and significant issuance probability at high opacity levels. Thus, the type of sukuk issued signal firms' willingness to disclose or obscure information, which is instructive for investors and policymakers. The findings show the disparency between the theoretical structure of sukuk and market perception. While the literature focuses on the rigorous disclosure and contractual requirements of sukuk, we are not

able to attain an empirical verification. On the contrary, results indicate that firms might raise funds via sukuk to go around market disclosure requirements. That is another evidence of the misapplication of Islamic finance which results in not realizing its objectives. The previous also necessitate improvement in legal and regulatory frameworks to address the association between firm opacity and sukuk issuances.

VIII. Appendix

I. Tables

Table II.1.: The frequencies of external funding raised by Malaysian firms.

Source	Freq.	Percent
Islamic Instruments		
Zero-coupon Sukuk	189	6.34
FI Sukuk	140	4.70
PLS Sukuk	47	1.57
Conventional Instruments		
Bank Loan	1,805	60.5
Equity	702	23.54
Bonds	98	3.28

This table shows the number of times each instrument is issued by Malaysian firms over the sample period. Percent is the proportion of each instrument utilization relative to the total external funding issuances. FI = fixed-income and PLS= profit-loss sharing.

Table II.2.: Sectors summary

Sector	(1) GIC Sector code	(2) No. of firms	(3) Obsv.	(4) PLS	(5) FIS	(6) ZCS	(7) Sukuk (total)	(8) Bonds	(9) Shares	(10) Bank loans
Industrial	20	33	1371	24	55	39	118	60	240	499
Real Estate	60	15	660	15	23	5	43	9	90	271
Consumer Discretionary	25	14	656	10	17	41	68	10	40	274
Energy	10	11	508	6	7	24	37	24	54	209
Materials	15	10	417	2	11	43	56	2	33	150
Consumer Staples	30	8	359	1	17	24	42	16	50	137
Telecommunication	50	6	294	1	28	0	29	11	47	103
Utilities	55	6	279	2	13	1	16	14	75	86
Healthcare	35	3	143	0	8	1	9	1	68	36
Technology	45	2	97	0	0	12	12	1	5	40
Total		107	4784	61	179	190	430	148	702	1805

The 107 Malaysian firms operate in 10 sectors. The GIC sector codes are according to the Compustat classification. The table presents the number of firms per sectors and the corresponding number of observations. Columns 4 to 10 show the frequency of issuing each external funding instrument across sectors. Frequency represent the number of times each instrument is issued by Malaysian firms over the sample period. A firm can use one instrument per quarter. PLS= profit-loss sharing, FIS= fixed-income sukuk and ZCS= zero-coupon sukuk.

Table II.3.: Variables definitions

Variable	Measure
1. Dependent Variable	
y_{it}	A dummy variable representing firms' funding sources for each firm i in quarter i. It takes values from 1-7 where: 1 = conventional bonds, 2= fixed income sukuk(FIS), 3= profit-loss sharing sukuk (PLS), 4= zero-coupon sukuk (ZCS), 5= Equity, 6= bank loans
2. Independent Variable	
(A) Variable of interest	
$OPAC_{it}$	Firm opacity index computed from the following indicators:
Effective Spread	$2\sqrt{-cov_{it}}$, *covit* is the first-order serial covariance of stock return
Quoted Spread	$Price_{ask} - Price_{bid}/Mean(Price_{ask} + Price_{bid})$
Trading Volume	The natural logarithm of the average daily dollar volume during a quarter
R^2	The goodness of fit obtained from a market model regression
Skewness	The skewness of return residuals obtained from the same market model regressions
Amihud	$\left(\frac{1}{D_i}\right)\sum_{t=1}^{D_i}\frac{\lvert r_{it}\rvert}{V_{it}}$, where r_{it} is the return, D_i is the number of days for stock i during a year. $V_{i,t}$ is the volume of stock i on quarter t.
Amivest	$\frac{P_{it}V_{it}}{\Sigma\lvert\%\Delta P_{it}\rvert}$, where P_{it} is the daily stock price
Volume-Return Coef.	C_2 obtained from $r_{it+1} = C_0 + C_{1i}.r_{it} + C_{2i}.V_{it}r_{it} + \upsilon_{it+1}$.
(B) Firm-specific characteristics	
$\sum_{k=1} X_{it}$	
Firm Size	The natural log of Total Assets
Tangibility	Total Fixed Assets/Total Assets
Book Leverage	(Debt in Current Liabilities + Long-term Debt)/Total Assets
Credit Strength	Altman Z-score $\left[\right.$ 3.3 × (earnings before interest, tax and extraordinary times) + sales + 1.4 × (retained earnings) + 1.2 × (current assets-current liabilities) $\left.\right]$ /total assets
Growth Opportunity	(Total Assets +Book Equity + (No of Shares outstanding * Share price))/Total Assets Book to Market Ratio
Liquidity	Total Current Assets/Total Current Liabilities
Profitability	Return on Assets (ROA) and Return on Equity(ROE)

Table II.4.: Opacity measures in the literature

Measure	Details	Source
Trading Volume	The natural logarithm of the average daily dollar volume during the fiscal year	(Leuz and Verrecchia, 2000) and (Lo et al., 2004)
Bid-ask spread	(ask price - bid price)/Average of bid and ask price	(Diamond and Verrecchia, 1991)
Opacity Index	Using the above measure to construct an index	(Duru et al., 2013) and (Anderson et al., 2009)
Stock market microstructure	Using variables such as the number of trades during a quarter, share turnover, average number of shares per transaction during a quarter, standard deviation of returns across all trades	(Bharath et al., 2009; Flannery et al., 2004)
Stock Price Synchronicity	R^2 obtained from an asset pricing model	(Dahiya et al., 2017; Jin and Myers, 2006)

This table presents a summary of opacity measures used in the literature. The inability of directly measuring firm opacity resulted in numerous indirect opacity indicators as the table demonstrate.

Table II.5.: Panel descriptive statistics of the opacity index and its components

Variable		Mean	Std. Dev.	Min	Max	Obser.
Opacity Index	overall	0.6203	0.0839	0.3	0.8625	N = 3635
	between		0.0496	0.48365	0.7487	n = 100
	within		0.06899	0.3983	0.8624	T-bar = 36.35
Effective Spread	overall	0.0485	0.0658		1.2939	N = 4588
	between		0.0292	0.0108	0.1669	n = 107
	within		0.0609	-0.0975	1.2917	T-T-bar = 42.8785
Quoted Spread	overall	0.0237	0.1959	-1.5671	1.575	N = 4425
	between		0.1709	-1.2215	1.2284	n = 107
	within		0.051	-0.8463	0.8952	T-bar = 41.3551
Trading Volume	overall	6.4802	1.9665	0.9982	15.775	N = 4362
	between		1.8069	2.731	13.2673	n = 107
	within		0.9261	3.0349	11.161	T-bar = 40.7664
R^2 FTSE	overall	0.1078	0.2015	-0.8958	0.8008	N = 4527
	between		0.0725	-0.0495	0.3353	n = 107
	within		0.1898	-0.7538	0.7624	T-bar = 42.3084
Skewness	overall	0.2796	1.376	-7.7998	7.8457	N = 4588
	between		0.2663	-0.6669	0.9226	n = 107
	within		1.3562	-8.0891	8.0259	T-bar = 42.8785
Amihud	overall	0.2504	0.7276	0	15.4885	N = 4237
	between	0	0.3802	0.0003	1.921	n = 105
	within	0	0.6101	-1.5365	13.8179	T-bar = 40.3524
Amivest	overall	35300.53	972775.2	0	46700000	N = 4413
	between	0	295045.3	0	3050701	n = 107
	within	0	929894.1	-3015401	43700000	T-bar = 41.243
Volume-Return Coef.	overall	-0.0003	0.0219	-0.6502	0.4415	N = 4009
	between	0	0.0039	-0.0359	0.0026	n = 104
	within	0	0.0216	-0.6146	0.439	T-bar = 38.5481

The opacity index used in this paper comprise of eight indirect indicators. The index takes values from 0.1 (low opacity) to 1 (high opacity). It is computed by ranking all measures into deciles where a value of 10 indicates high opacity, and a value of 1 reflect low opacity. The deciles are summed for each firm in each quarter and is divided by the maximum total points = 80. The index components are: *Effective Spread* $= 2\sqrt{-cov_{it}}$, where cov_{it} is the first-order serial covariance of stock return, *Quoted Spread* $= Price_{ask} - Price_{bid}/Mean(Price_{ask} + Price_{bid}$. *Trading Volume* = the natural logarithm of the average daily dollar volume during a quarter. R^2 *FTSE* is the goodness of fit obtained from a market model regression. Skewness is the skewness of return residuals obtained from the same market model regressions. *Amihud* $= \left(\frac{1}{D_i}\right) \sum_{t=1}^{D_i} \frac{|r_{it}|}{V_{it}}$, where r_{it} is the return, D_i is the number of days for stock i during a year. $V_{i,t}$ is the volume of stock i on quarter t. *Amivest* $= \frac{P_{it}V_{it}}{\Sigma|\%\Delta P_{it}|}$, where P_{it} is the daily stock price. *Volume-Return Coef.* is C_2 obtained from $r_{it+1} = C_0 + C_{1i}.r_{it} + C_{2i}.V_{it}r_{it} + \upsilon_{it+1}$.

Table II.6.: Panel statistics of firm characteristics

Variable		Mean	Std. Dev.	Min	Max	Obser.
Size	overall	6.3702	1.5173	1.2960	10.44	N = 4608
	between		1.4281	2.8540	10.1014	n = 105
	within		0.54716	1.67551	9.4773	T-bar = 43.8857
Tangibility	overall	0.2882	0.23298	0	0.93670	N = 4608
	between		0.2126	0	0.78536	n = 105
	within		0.09838	-0.22923	0.80070	T-bar = 43.8857
Leverage	overall	0.4414	0.33518	0	1	N = 4739
	between		0.2925	0.00044	1	n = 108
	within		0.17103	-0.25066	1.389072	T-bar = 43.8796
Z-score	overall	0.56812	0.5455	-5.7231	2.0820	N = 4608
	between		0.41169	-0.6763	1.5888	n = 105
	within		0.35124	-4.7413	2.45051	T-bar = 43.8857

This table presents summary statistics of 107 Malaysian firms. It shows the overall, between, and within sample mean, standard deviation, minimum and maximum values of firm-specific characteristics over the period 2005–2017. The firm-specific variables are as follows. Size: defined as the natural logarithm of total assets. Tangibility: defined as net fixed assets over book value of total assets. Leverage: defined as the book value of long term debt over total assets. Z-score: a measure of firm solvency measured as: $\lceil$ 3.3 × (earnings before interest, tax and extraordinary times) + sales + 1.4 × (retained earnings) + 1.2 × (current assets-current liabilities) $\rceil$ /total assets. *Obser.* is the number of observations, and number of firms respectively.

Table II.7.: Correlation matrix of the opacity index components

Effective Spread	Quoted Spread	Trading Vol.	R^2	Skweness	Amihud	Amivest	Vol-ret. Coef.	
Effective Spread	1.000							
Quoted Spread	0.18	1.000						
Trading Vol.	0.0678	-0.1169	1.000					
R^2	0.0229	-0.0649	0.0995	1.000				
Skweness	0.0233	0.0131	0.0317	-0.0186	1.000			
Amihud	-0.0271	0.042	-0.4714	-0.101	-0.0164	1.000		
Amivest	-0.0255	-0.0028	0.1329	-0.0385	0.0019	-0.0128	1.000	
Vol-ret. Coef.	0.0129	0.0013	0.0419	-0.007	-0.0128	-0.0545	0.0008	1.000

This table presents the correlation coefficients between the opacity index components. The index components are: *Effective Spread* = $2\sqrt{-cov_{it}}$, where cov_{it} is the first-order serial covariance of stock return, *Quoted Spread* = $Price_{ask} - Price_{bid}/Mean(Price_{ask} + Price_{bid}$. *Trading Volume* = the natural logarithm of the average daily dollar volume during a quarter. R^2 *FTSE* is the goodness of fit obtained from a market model regression. Skewness is the skewness of return residuals obtained from the same market model regressions. *Amihud* = $\left(\frac{1}{D_i}\right)\sum_{t=1}^{D_i}\frac{|r_{it}|}{V_{it}}$, where r_{it} is the return, D_i is the number of days for stock i during a year. $V_{i,t}$ is the volume of stock i on quarter t. *Amivest* = $\frac{P_{it}V_{it}}{\Sigma|\%\Delta P_{it}|}$, where P_{it} is the daily stock price. *Volume-Return Coef.* is C_2 obtained from $r_{it+1} = C_0 + C_{1i}.r_{it} + C_{2i}.V_{it}r_{it} + \upsilon_{it+1}$.

Table II.8.: Correlation matrix of the opacity index and firm-characteristics

	Opacity Index	Size	Tangibility	Leverage	Zscore
Opacity Index	1				
Size	-0.3078	1			
Tangibility	-0.0427	0.1573	1		
Leverage	0.0649	0.0474	-0.0517	1	
Zscore	0.0687	-0.0062	-0.0078	-0.2077	1

This table presents the correlation coefficients between the opacity index and firm-specific characteristics. The firm-specific variables are as follows. Size: defined as the natural logarithm of total assets. Tangibility: defined as net fixed assets over book value of total assets. Leverage: defined as the book value of long term debt over total assets. Z-score: a measure of firm solvency measured as: $\lceil$ 3.3 × (earnings before interest, tax and extraordinary times) + sales + 1.4 × (retained earnings) + 1.2 × (current assets-current liabilities) $\rceil$ /total assets.

Table II.9.: Mixed-level multinomial logistic regressions output.

(A) Three-level Model					
Explanatory Variable	FI Sukuk	PLS Sukuk	ZC Sukuk	Shares	Bank Loans
Opacity	-4.030*	-0.553	4.972**	-7.560***	-3.781**
	(-1.88)	(-0.19)	(2.31)	(-3.86)	(-2.13)
Size	0.232*	0.791***	-0.470***	0.500***	-0.261**
	(1.78)	(4.19)	(-3.16)	(3.22)	(-2.33)
Tangibility	-0.584	-3.527***	-1.073	-1.643**	-1.366**
	(-0.85)	(-3.33)	(-1.23)	(-2.07)	(-2.30)
Leverage	-2.472***	-0.685	0.318	-2.187***	-1.012**
	(-4.63)	(-0.93)	(0.54)	(-3.89)	(-2.34)
Solvency	-1.253***	-0.646	-0.286	-0.478	-0.425
	(-3.44)	(-1.12)	(-0.73)	(-1.22)	(-1.32)
Constant	3.582**	-4.128	0.0284	4.205**	8.265***
	(2.02)	(-1.59)	(0.01)	(2.34)	(5.46)
Sector Variance Component	0.107				
	(0.68)				
Firm Variance Component	6.13e-08				
	(0.12)				
$N = 2129$					
(B) Two-Level Model (Sector)					
Explanatory Variable	FI Sukuk	PLS Sukuk	ZC Sukuk	Shares	Bank Loans
Opacity	-4.809**	-1.964	4.661**	-6.360***	-4.094**
	(-2.25)	(-0.70)	(2.24)	(-3.48)	(-2.32)
Size	0.138	0.527***	-0.573***	0.304***	-0.344***
	(1.20)	(3.14)	(-4.88)	(2.96)	(-3.56)
Tangibility	-0.475	-3.243***	-0.000381	-2.275***	-1.288**
	(-0.71)	(-3.28)	(-0.00)	(-3.74)	(-2.26)
Leverage	-2.572***	-0.586	-0.907*	-1.429***	-1.447***
	(-4.82)	(-0.83)	(-1.82)	(-3.27)	(-3.50)
Solvency	-1.267***	-0.596	-0.346	-0.140	-0.469
	(-3.57)	(-1.02)	(-0.99)	(-0.42)	(-1.50)
Constant	4.695***	-1.474	1.910	5.462***	9.220***
	(2.71)	(-0.62)	(1.08)	(3.55)	(6.24)
Sector Variance Component	8.99e-09				
	(0.08)				
$N = 2129$					
(C) Two-Level Model (Firm)					
Explanatory Variable	FI Sukuk	PLS Sukuk	ZC Sukuk	Shares	Bank Loans
Opacity	-4.359**	-1.559	4.040*	-8.036***	-4.121**
	(-2.04)	(-0.55)	(1.90)	(-4.11)	(-2.33)
Size	0.141	0.538***	-0.694***	0.355**	-0.360***
	(1.25)	(3.30)	(-5.08)	(2.49)	(-3.66)
Tangibility	-0.482	-3.354***	-0.365	-1.496*	-1.288**
	(-0.71)	(-3.27)	(-0.46)	(-1.91)	(-2.20)
Leverage	-2.481***	-0.889	0.151	-2.214***	-1.056**
	(-4.68)	(-1.23)	(0.26)	(-3.96)	(-2.46)
Solvency	-1.233***	-0.537	-0.240	-0.494	-0.394
	(-3.45)	(-0.93)	(-0.65)	(-1.29)	(-1.25)
Constant	4.339**	-1.677	2.413	5.516***	9.099***
	(2.52)	(-0.71)	(1.33)	(3.15)	(6.17)
Firm Variance Component	4.99e-08				
	(0.12)				
$N = 2129$					

This table presents the mixed-level multinomial logistic regressions results of funding source dummy variable against firms' opacity and other firm-specific characteristics estimated from Equations II.1 and II.2. All variables are defined in Table II.3 . Panel (A) shows the coefficients from a three-level mixed model with random sector and firm intercepts. Panel (B) shows the coefficients from a two-level mixed model with random sector intercepts. Panel (C) shows the coefficients from a two-level mixed model with random firm intercepts. N is the number of observations. t statistics in parentheses. Significance levels: * (p<0.10), ** (p<0.05), (p<0.01).

Table II.10.: Marginal effects of opacity on funding sources.

Three-level Model						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	0.1123036**	0.0553246	2.03	0.042	0.0038694	0.2207378
FIS	-0.0026285	0.0621904	-0.04	0.966	-0.1245195	0.1192624
PLS	0.0629431	0.0443025	1.42	0.155	-0.0238883	0.1497745
ZCS	0.4870136***	0.1479762	3.29	0.001	0.1969856	0.7770415
Equity	-0.4259234***	0.1049211	-4.06	0.00	-0.6315651	-0.2202818
Bank Loans	-0.2337084	0.1640298	-1.42	0.154	-0.5552009	0.0877842
Two-level Model (Firm)						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	0.1105322**	0.0479275	2.31	0.021	0.0165961	0.2044684
FIS	0.0011848	0.0625831	0.02	0.985	-0.1214757	0.1238454
PLS	0.0524957	0.0381124	1.38	0.168	-0.0222033	0.1271946
ZCS	0.5156062***	0.0864065	5.97	0.000	0.3462526	0.6849599
Equity	-0.4405091***	0.1114388	-3.95	0.000	-0.6589251	-0.2220931
Bank Loans	-0.2393099*	0.1448039	-1.65	0.098	-0.5231203	0.0445005
Three-level Model (Sukuk Types Combined)						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.1076356*	0.0559105	1.93	0.054	-0.0019469	0.217218
Sukuk	0.5860284***	0.1109064	5.28	0.000	0.368656	0.8034009
Shares	-0.4014543***	0.1012739	-3.96	0.000	-0.5999474	-0.2029612
Bank Loans	-0.2922097**	0.13336	-2.19	0.028	-0.5535905	-0.0308289
Two-level Model (Sukuk Types Combined) - Firm						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.1077235**	0.0475737	2.26	0.024	0.0144809	0.2009662
Sukuk	0.5784615***	0.0988238	5.85	0.000	0.3847704	0.7721526
Shares	-0.3910766***	0.1357502	-2.88	0.004	-0.6571421	-0.1250112
Bank Loans	-0.2951084*	0.162871	-1.81	0.07	-0.6143297	0.0241129

This table report the impact of opacity on the probability of issuing each funding source. Probabilities are obtained from the multilevel multinomial regressions (Equations II.1 and II.2) presented in Table II.9. Funding sources as follows. Bonds: conventional bonds. FIS: Fixed income sukuk. PLS: Profit-loss sharing sukuk. ZCS: Zero-coupon sukuk. Equity: Shares. Bank loans: the 5% increase in long-term debt. Significance levels: * ($p<0.10$), ** ($p<0.05$), ($p<0.01$).

Table II.11.: Marginal effects of opacity on funding sources for sub-samples (size and leverage)

Small Firms						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	-0.1095577	0.1238157	-0.88	0.376	-0.3522321	0.1331168
FIS	0.0310922	0.0640834	0.49	0.628	-0.0945089	0.1566933
PLS	0.0194564	0.0398668	0.49	0.626	-0.0586811	0.0975939
ZCS	0.9330011***	0.2838175	3.29	0.001	0.376729	1.489273
Equity	-0.4713593***	0.1499935	-3.14	0.002	-0.7653412	-0.1773774
Bank Loans	-0.4026327	0.2886258	-1.39	0.163	-0.9683289	0.1630634
Medium Firms						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	-0.086055	0.0770082	-1.12	0.264	-0.2369884	0.0648784
FIS	0.1204614	0.1510415	0.8	0.425	-0.1755744	0.4164972
PLS	0.0806192	0.0738844	1.09	0.275	-0.0641915	0.22543
ZCS	0.3117205**	0.1478183	2.11	0.035	0.0220019	0.6014391
Equity	-0.7160865***	0.2186548	-3.27	0.001	-1.144642	-0.287531
Bank Loans	0.2893403	0.2841496	1.02	0.309	-0.2675826	0.8462633
Large Firms						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	0.2739214***	0.0920501	2.98	0.003	0.0935065	0.4543363
FIS	-0.1994084	0.1373054	-1.45	0.146	-0.4685221	0.0697053
PLS	-0.0953295	0.1029552	-0.93	0.354	-0.297118	0.1064589
ZCS	0.0760786	0.103537	0.73	0.462	-0.1268502	0.2790074
Equity	0.7911907***	0.2517383	3.14	0.002	0.2977927	1.284589
Bank Loans	-0.8464528***	0.2533681	-3.34	0.001	-1.343045	-0.3498604
Low Leverage						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	-0.0757322	0.1203376	-0.63	0.529	-0.3115895	0.1601251
FIS	-0.1471111	0.1520562	-0.97	0.333	-0.4451358	0.1509136
PLS	0.0708502	0.0653654	1.08	0.278	-0.0572637	0.1989641
ZCS	0.2041255*	0.1216097	1.68	0.093	-0.0342252	0.4424763
Equity	-0.4115731*	0.2252924	-1.83	0.068	-0.8531381	0.0299919
BankLoans	0.3594407	0.2669995	1.35	0.178	-0.1638688	0.8827501
Medium Leverage						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	0.0368868	0.0640067	0.58	0.564	-0.0885639	0.1623376
FIS	0.0467629	0.1328589	0.35	0.725	-0.2136357	0.3071615
PLS	-0.0306646	0.0516596	-0.59	0.553	-0.1319154	0.0705863
ZCS	0.4579547***	0.1539842	2.97	0.003	0.1561512	0.7597582
Equity	-0.1406295	0.2236864	-0.63	0.53	-0.5790467	0.2977877
BankLoans	-0.3703104	0.2268409	-1.63	0.103	-0.8149105	0.0742897
High Leverage						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bond	0.3257714***	0.1178468	2.76	0.006	0.0947959	0.5567469
FIS	0.0402762	0.0946181	0.43	0.67	-0.1451718	0.2257242
PLS	0.0752312	0.0937181	0.8	0.422	-0.1084529	0.2589153
ZCS	0.5816247***	0.1884667	3.09	0.002	0.2122368	0.9510127
Equity	-0.6136686***	0.2013902	-3.05	0.002	-1.008386	-0.2189509
BankLoans	-0.4092351*	0.2434409	-1.68	0.093	-0.8863705	0.0679004

This table report the impact of opacity on the probability of issuing each funding source for a number of sub-samples: Small, medium and large firms, and low, medium, and high leveraged firms. Probabilities are obtained from the multilevel multinomial regressions (Equations equations II.1 and II.2). Funding sources as follows. Bonds: conventional bonds. FIS: Fixed income sukuk. PLS: Profit-loss sharing sukuk. ZCS: Zero-coupon sukuk. Equity: Shares. Bank loans: the 5% increase in long-term debt. Significance levels: * ($p<0.10$), ** ($p<0.05$), ($p<0.01$).

Table II.12.: Marginal effects of opacity on funding sources for sub-samples (firm value and growth)

Positive Change in Firm Value						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.06367	0.0617991	1.03	0.303	-0.0574541	0.1847941
FIS	0.0171702	0.0749709	0.23	0.819	-0.1297701	0.1641105
PLS	-0.0201961	0.0569125	-0.35	0.723	-0.1317426	0.0913503
ZCS	0.3884047***	0.1004536	3.87	0.000	0.1915192	0.5852901
Equity	-0.350717**	0.1647985	-2.13	0.033	-0.6737163	-0.0277178
Bank Loans	-0.0983317	0.1808929	-0.54	0.587	-0.4528752	0.2562118
Negative Change in Firm Value						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.1489611**	0.0708745	2.1	0.036	0.0100496	0.2878727
FIS	-0.0983208	0.0914753	-1.07	0.282	-0.2776091	0.0809675
PLS	0.0907204	0.0551836	1.64	0.1	-0.0174375	0.1988784
ZCS	0.6411625***	0.1510972	4.24	0.000	0.3450174	0.9373076
Equity	-0.4334384***	0.1509365	-2.87	0.004	-0.7292686	-0.1376083
Bank Loans	-0.3490849	0.2262677	-1.54	0.123	-0.7925615	0.0943917
Positive Investment Opp.						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.0757593	0.0568776	1.33	0.183	-0.0357188	0.1872374
FIS	0.0762448	0.0807421	0.94	0.345	-0.0820067	0.2344963
PLS	-0.0006335	0.0393149	-0.02	0.987	-0.0776893	0.0764222
ZCS	0.6825508***	0.1657192	4.12	0.000	0.3577472	1.007354
Equity	-0.6462405***	0.1576559	-4.1	0.000	-0.9552404	-0.3372405
Bank Loans	-0.1876809	0.239744	-0.78	0.434	-0.6575705	0.2822087
Negative Investment Opp.						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.1448957*	0.0871312	1.66	0.096	-0.0258784	0.3156697
FIS	-0.2000085*	0.1023497	-1.95	0.051	-0.4006103	0.0005932
PLS	0.1062458	0.0728242	1.46	0.145	-0.0364869	0.2489786
ZCS	0.3589662***	0.1023305	3.51	0.000	0.1584021	0.5595303
Equity	-0.1887989	0.1733886	-1.09	0.276	-0.5286343	0.1510365
Bank Loans	-0.2213003	0.1957045	-1.13	0.258	-0.604874	0.1622734

This table report the impact of opacity on the probability of issuing each funding source for a number of sub-samples: Positive and negative change in firm values and positive and negative investment opportunities of firms. Probabilities are obtained from the multilevel multinomial regressions (Equations II.1 and II.2). Funding sources as follows. Bonds: conventional bonds. FIS: Fixed income sukuk. PLS: Profit-loss sharing sukuk. ZCS: Zero-coupon sukuk. Equity: Shares. Bank loans: the 5% increase in long-term debt. Significance levels: * ($p<0.10$), ** ($p<0.05$), ($p<0.01$).

Table II.13.: Marginal effects of opacity on funding sources for sub-samples (profitability)

Positive ROA						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	0.1383793***	0.0524944	2.64	0.008	0.0354922	0.2412664
FIS	-0.0186178	0.06299	-0.3	0.768	-0.1420759	0.1048403
PLS	0.0362404	0.0425464	0.85	0.394	-0.0471491	0.1196299
ZCS	0.4699306***	0.0862208	5.45	0.000	0.3009409	0.6389203
Equity	-0.3100938**	0.1229654	-2.52	0.012	-0.5511014	-0.0690861
Bank Loans	-0.3158388**	0.1443855	-2.19	0.029	-0.5988291	-0.0328484
Negative ROA						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Int.]
Bonds	-0.1377388	0.1185777	-1.16	0.245	-0.3701469	0.0946693
FIS	-0.1019819	0.2015422	-0.51	0.613	-0.4969973	0.2930336
PLS	0.2787999	0.1833997	1.52	0.128	-0.080657	0.6382567
ZCS	0.7792319***	0.209688	3.72	0.000	0.368251	1.190213
Equity	-1.012897***	0.2882305	-3.51	0.000	-1.577818	-0.4479757
Bank Loans	0.1945858	0.3823931	0.51	0.611	-0.5548909	0.9440625

This table report the impact of opacity on the probability of issuing each funding source for a number of sub-samples: Profitable and troubled firms. Probabilities are obtained from the multilevel multinomial regressions (Equations II.1 and II.2). Funding sources as follows. Bonds: conventional bonds. FIS: Fixed income sukuk. PLS: Profit-loss sharing sukuk. ZCS: Zero-coupon sukuk. Equity: Shares. Bank loans: the 5% increase in long-term debt. * (p<0.10), ** (p<0.05), (p<0.01).

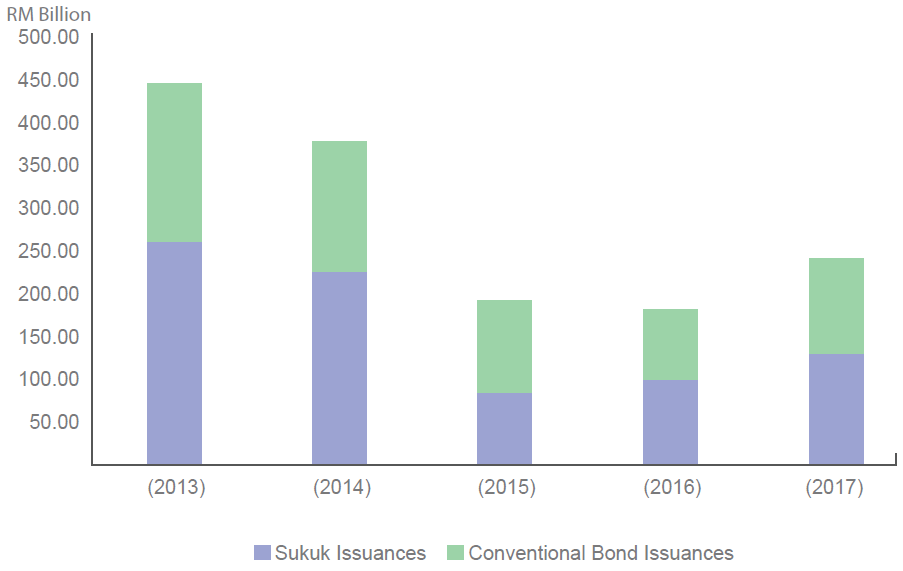
Table II.14.: Variance components

Model	Variance
Two-level model (Firm)	4.99e-08
	(0.12)
Three-level model	
Sector	0.107
	(0.68)
Firm	6.13e-08
	(0.12)

Variances obtained from three-level and two-level mixed model regressions (equations II.1 and II.2). Variances demonstrate the role of each cluster level (sector and firm in our regressions) in determining the source of external capital funding

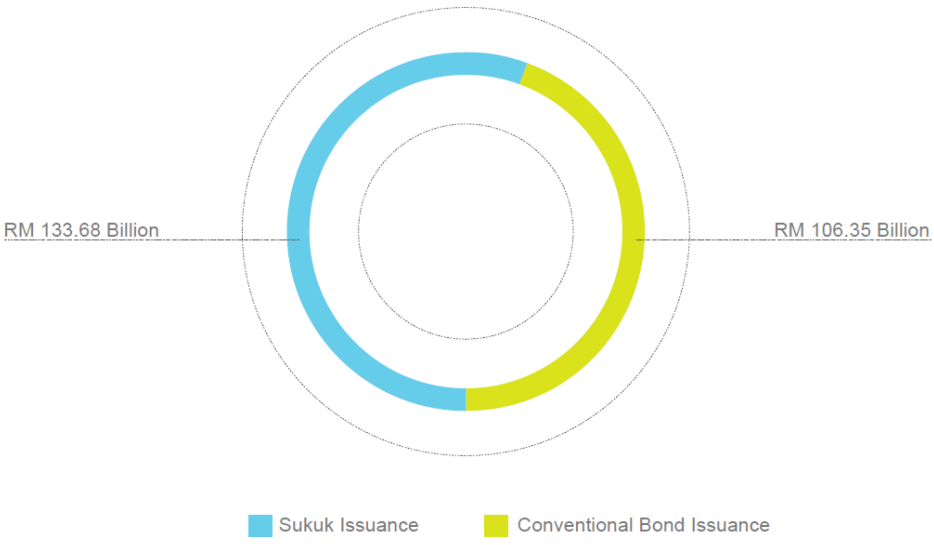
II. Figures

Figure II.1.: The issuances of sukuk and conventional bonds in Malaysia in the period 2013–2017.



Source: International Islamic Financial Market(IIFM) Annual Sukuk Report,2018.

Figure II.2.: The value of Malaysian sukuk and conventional bonds issuances in 2017.



Source: International Islamic Financial Market(IIFM) Annual Sukuk Report,2018.

Figure II.3.: A Three-level Mixed model: An illustration of nested clusters

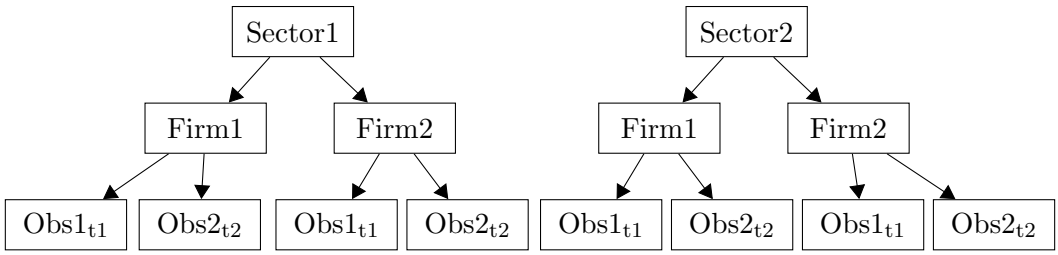


Figure II.4.: Variation of sukuk issuances between and within sectors. Y-axis= number of issuances, x-axis = sectors.

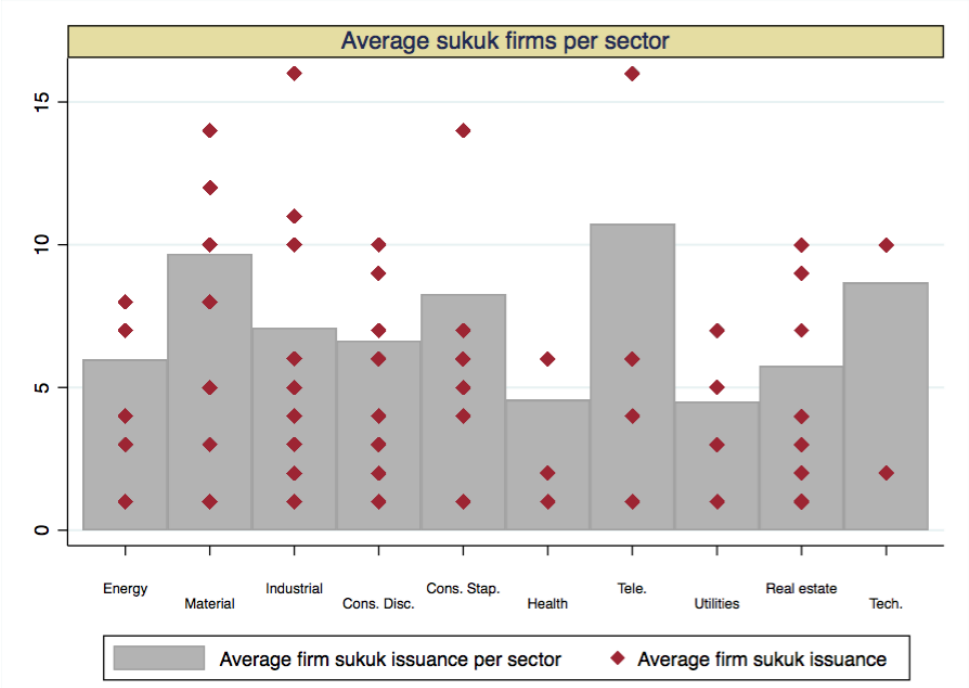


Figure II.5.: Variation of sukuk issuances between firms and firm periods.

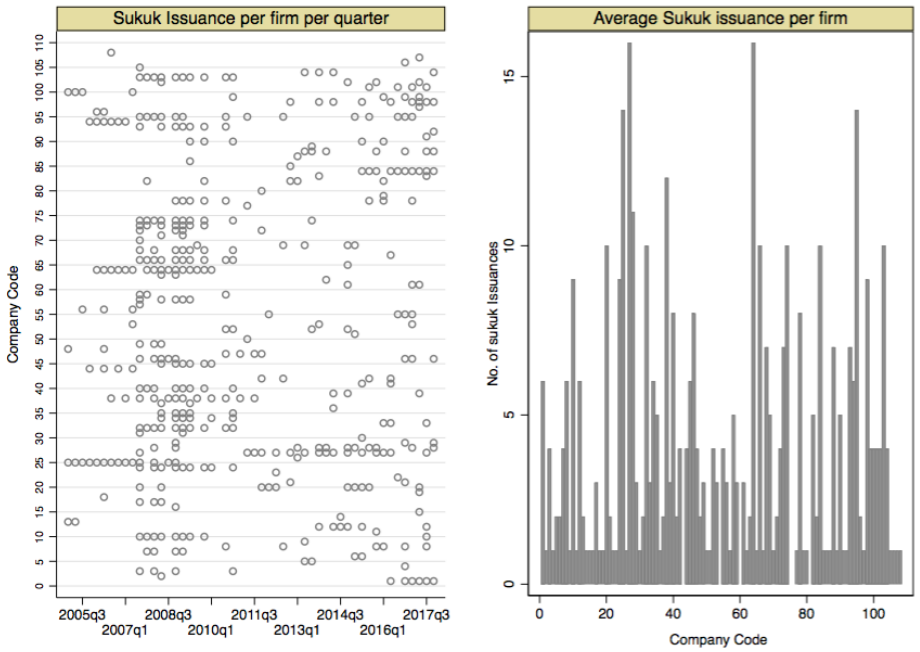


Figure II.6.: The average frequency of issuing sukuk, bonds and equity over the sample period.

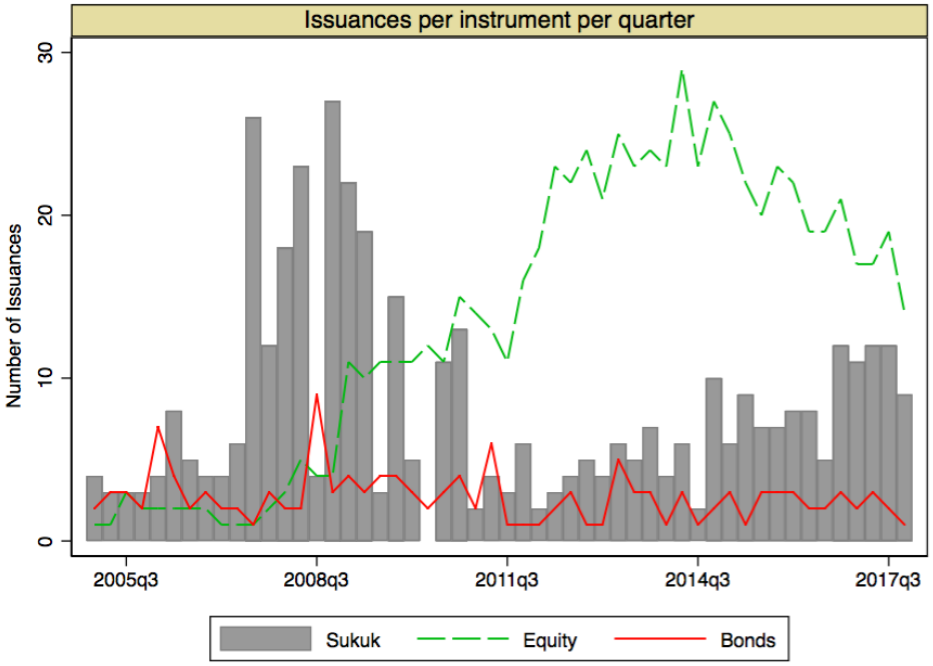


Figure II.7.: Opacity index vs. the frequency of issuing each type of financing.

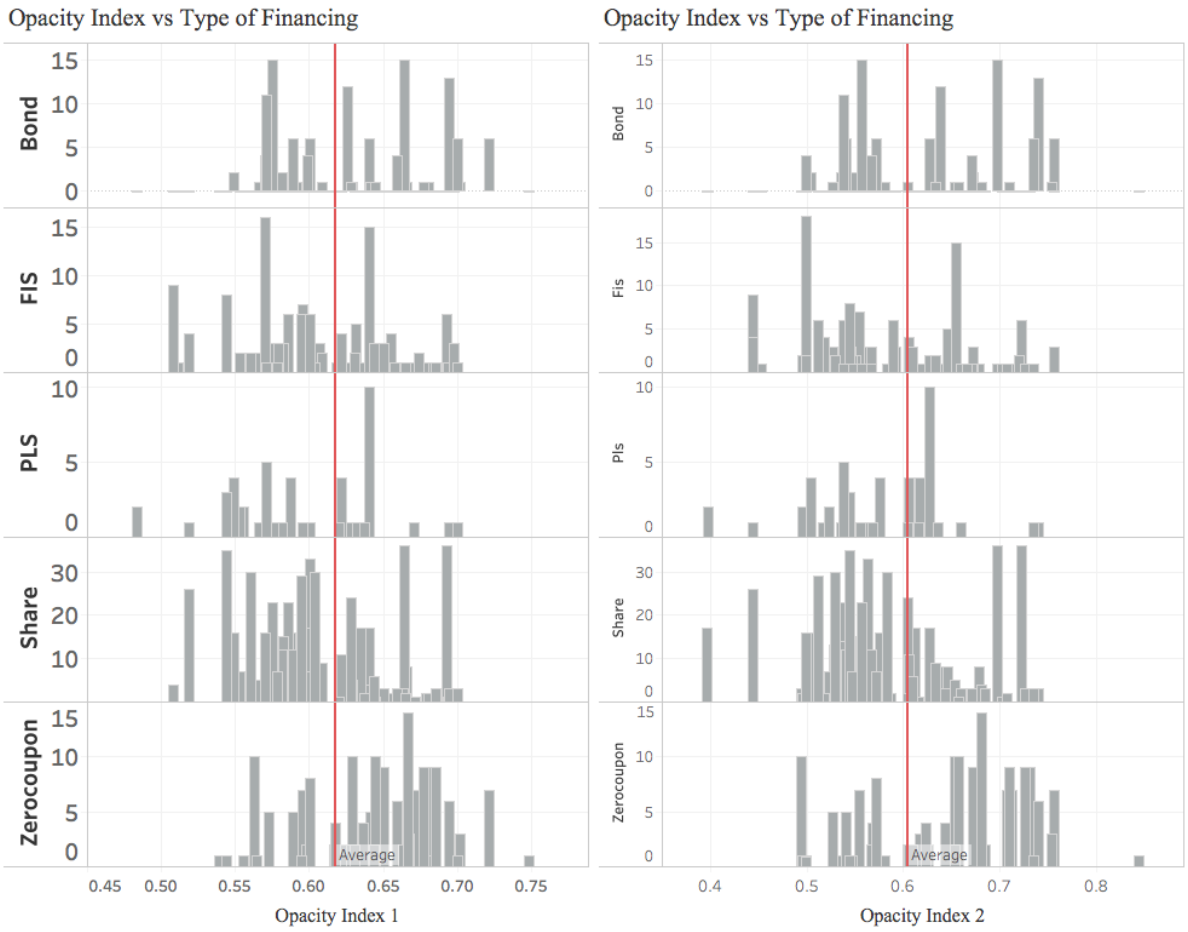


Figure II.8.: Frequency of external funding issuances vs. average R^2 and average return skewness.

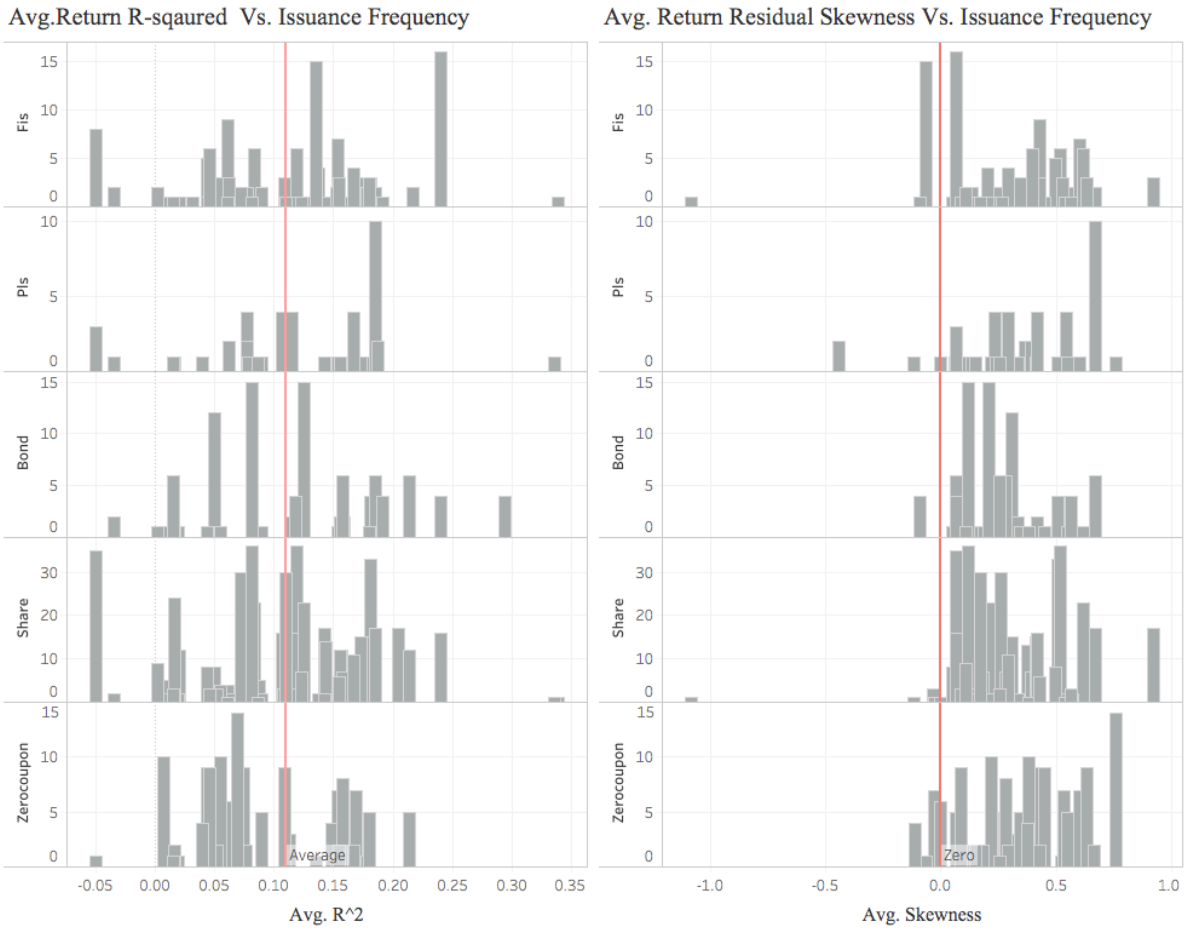


Figure II.9.: The frequency of using each funding source relative to the value of Amihud.

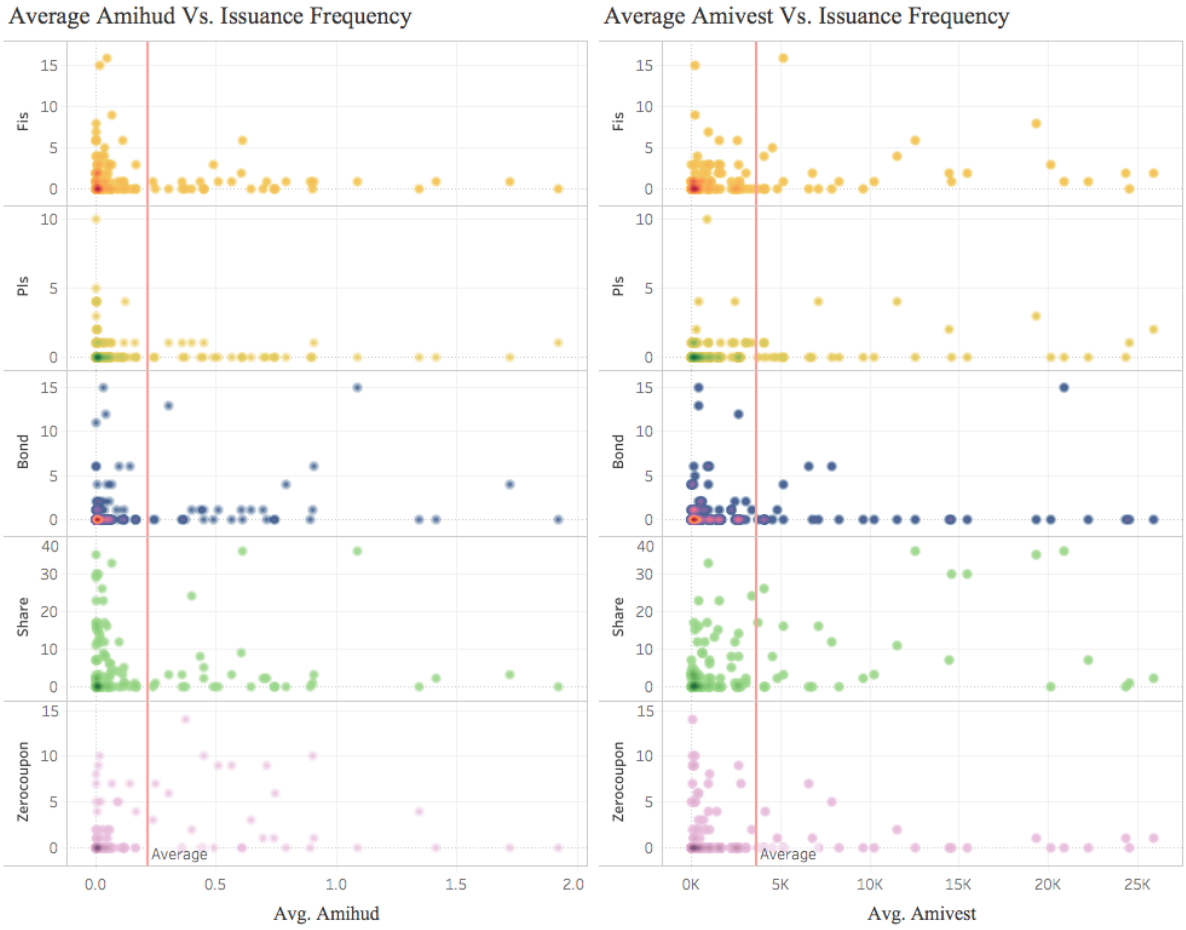


Figure II.10.: The frequency of external funding issuances vs. average trading volume and volume-return coefficient

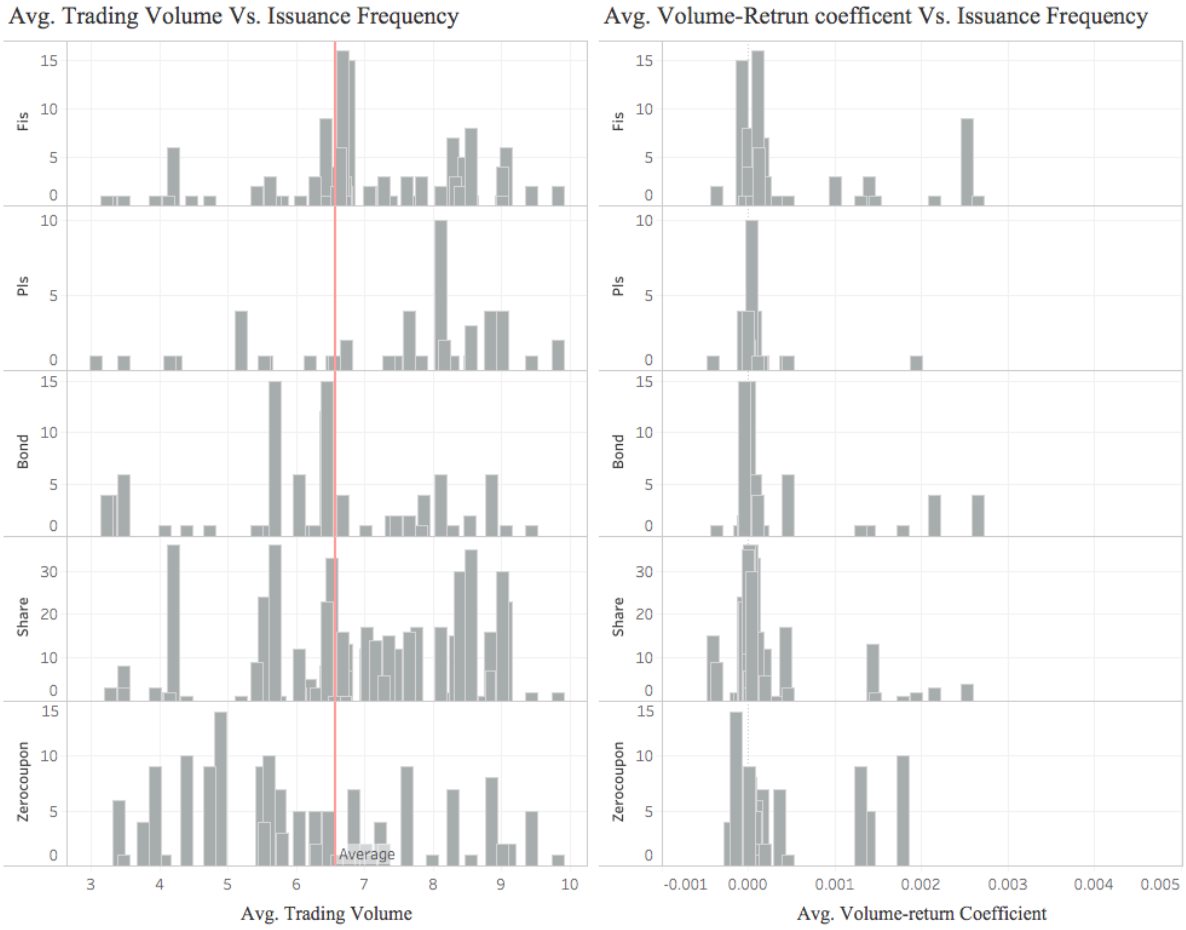


Figure II.11.: The frequency of external funding issuances vs. qouted and effective spreads

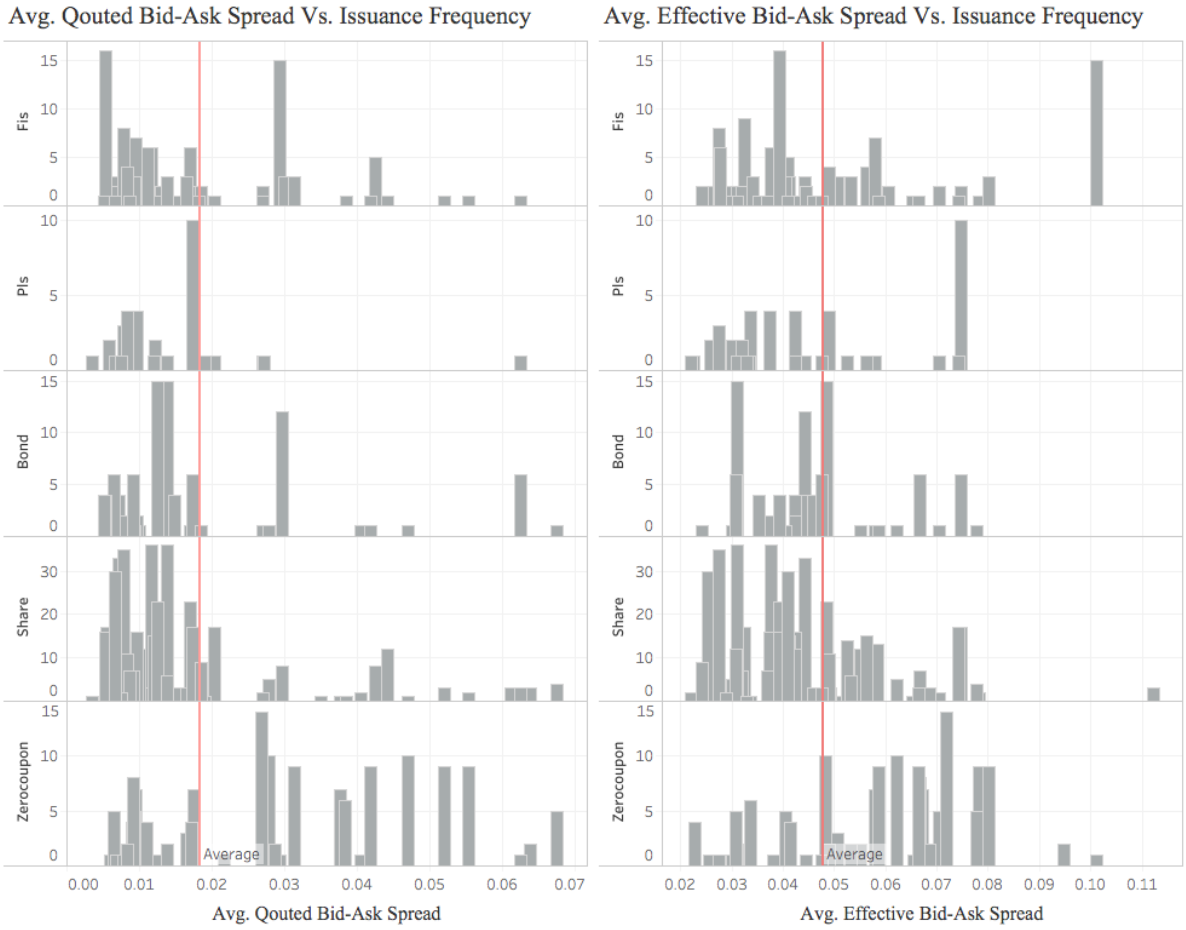


Figure II.12.: The relationship between opacity index and firm characteristics: firm size, market leverage, z-score, and profitability.

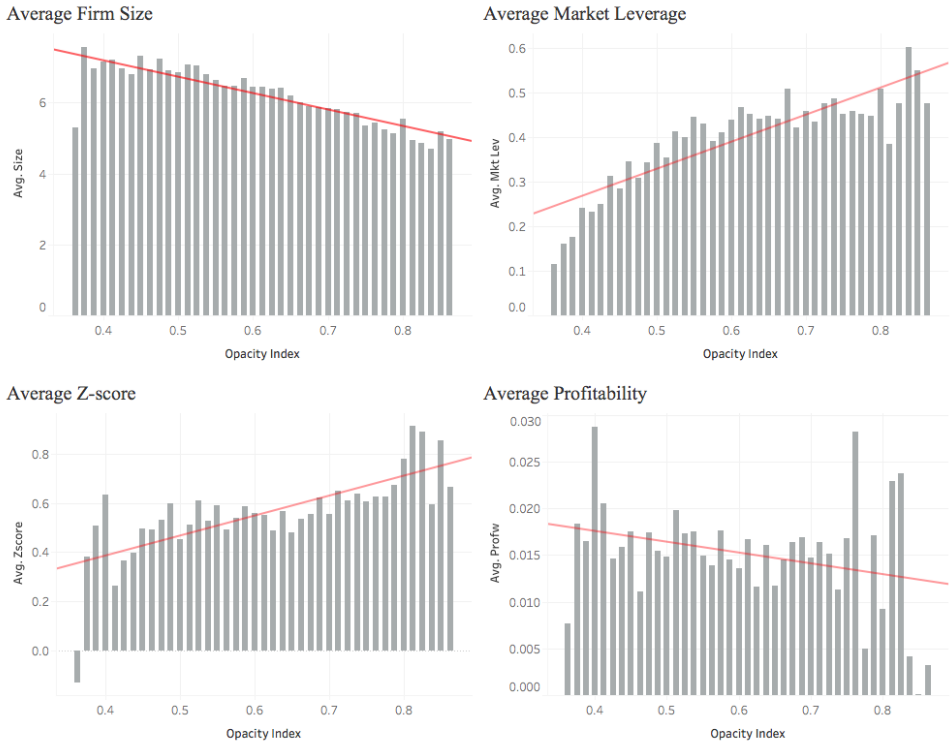


Figure II.13.: Duration and amount issued via instrument over time.

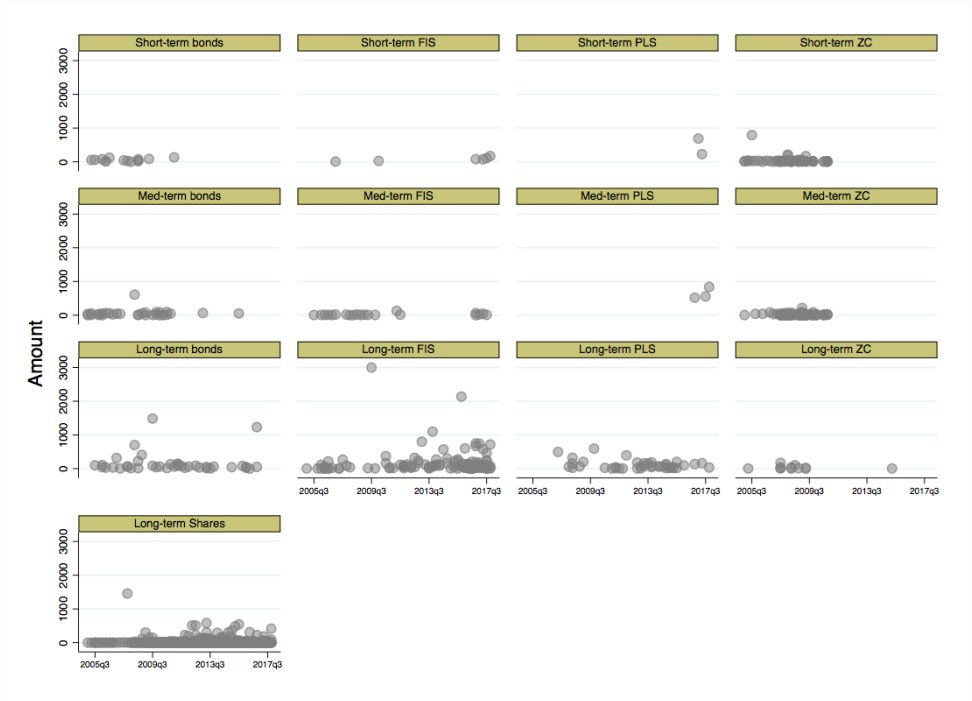
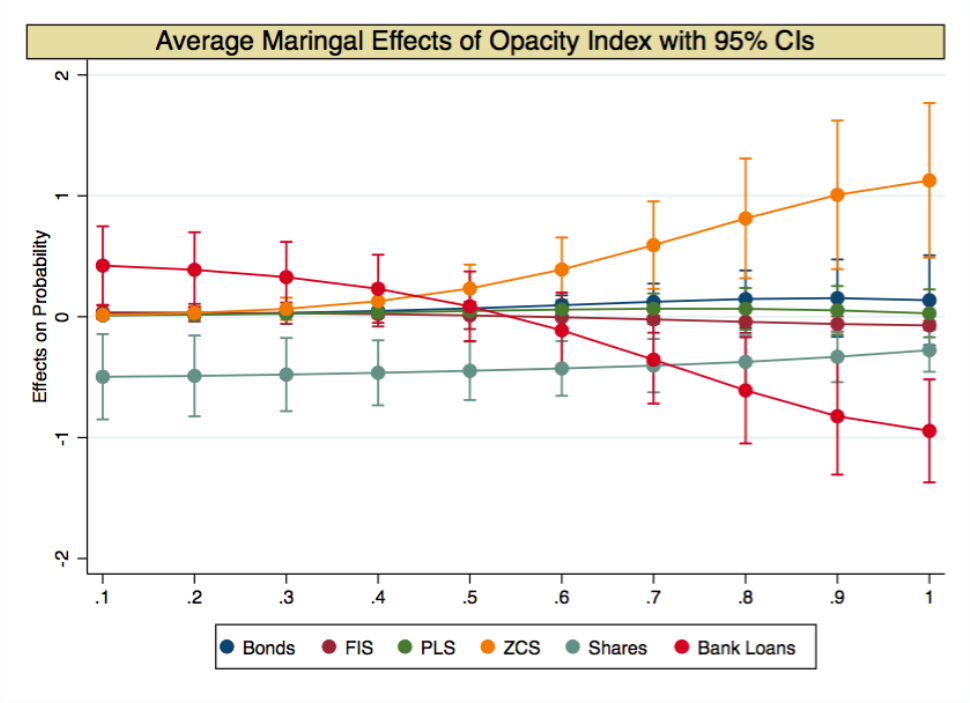
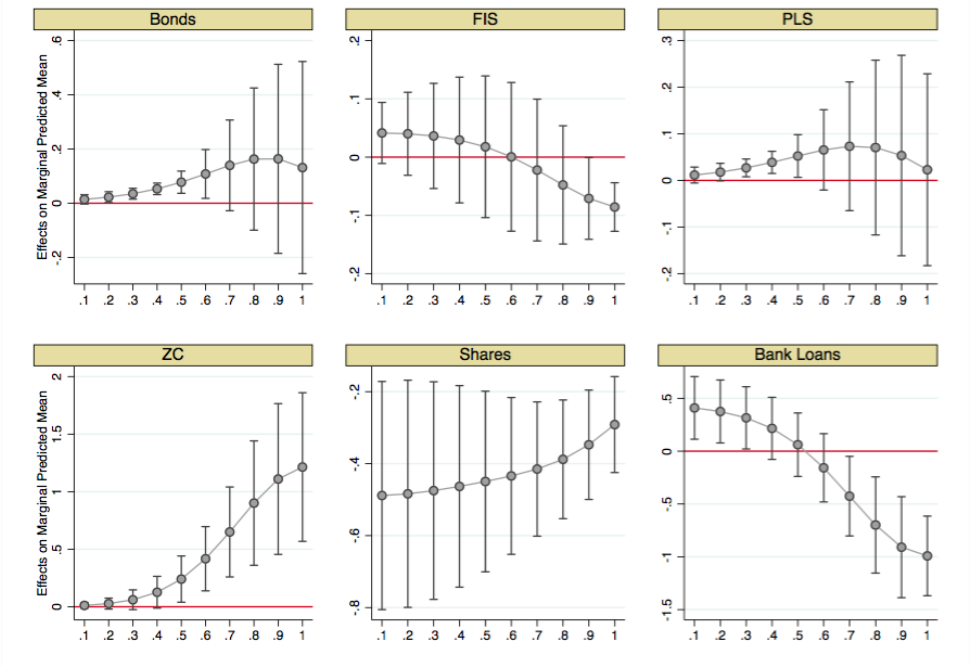


Figure II.14.: The average effect of opacity on the probability of issuing each funding instrument. The x-axis is opacity index and the y-axis is the average effect on probability.



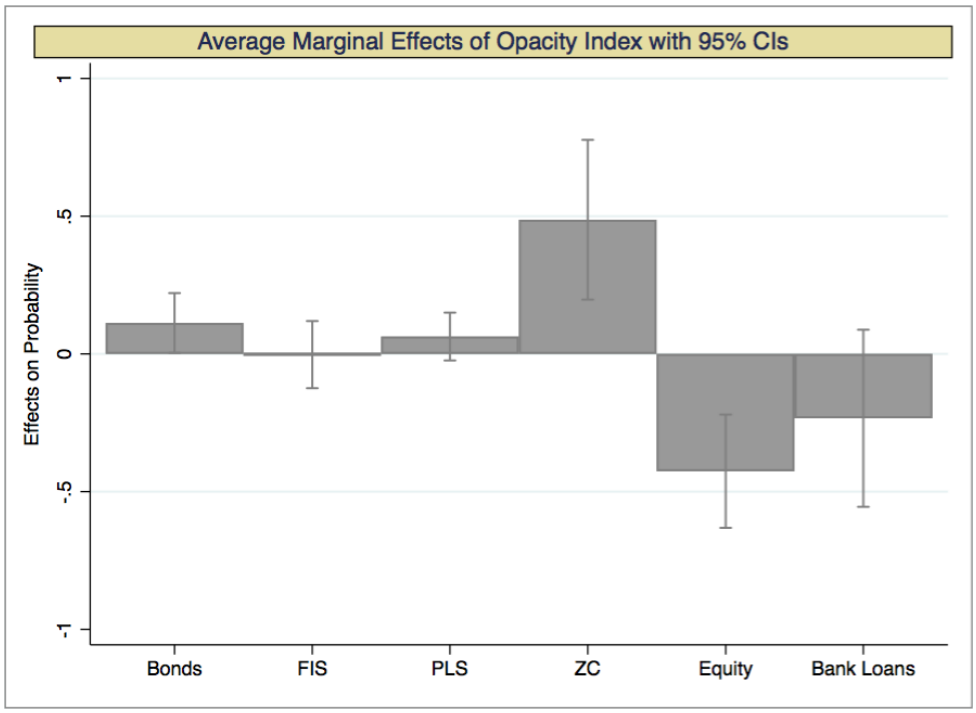
The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.15.: The average effect of opacity on the probability of issuing each funding instrument.



The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

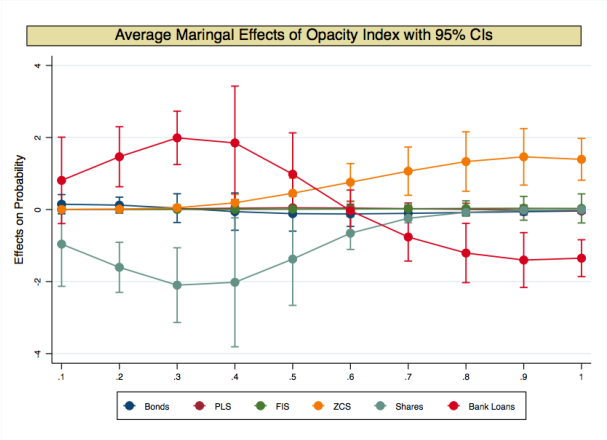
Figure II.16.: The average effect of opacity on the probability of issuing each funding instrument.



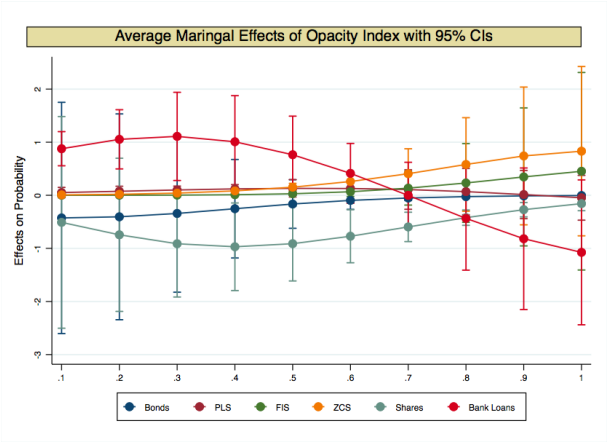
The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.17.: Marginal effects of opacity (sub-samples based on firm size)

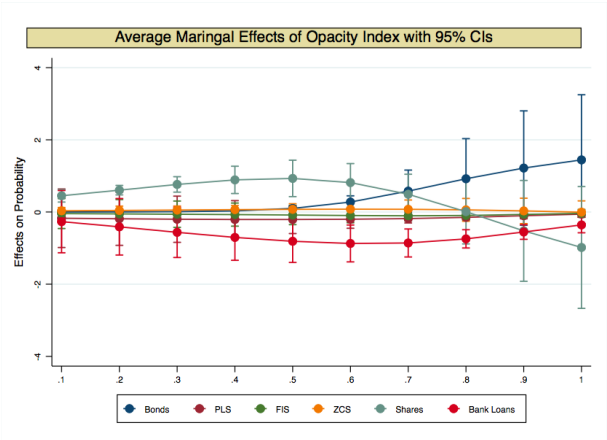
(a) Small Firms



(b) Medium Firms



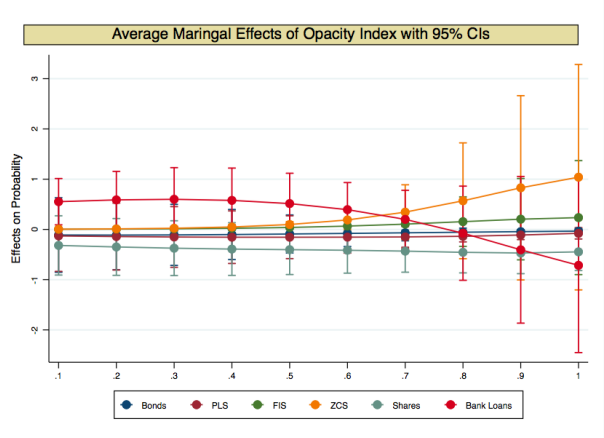
(c) Large Firms



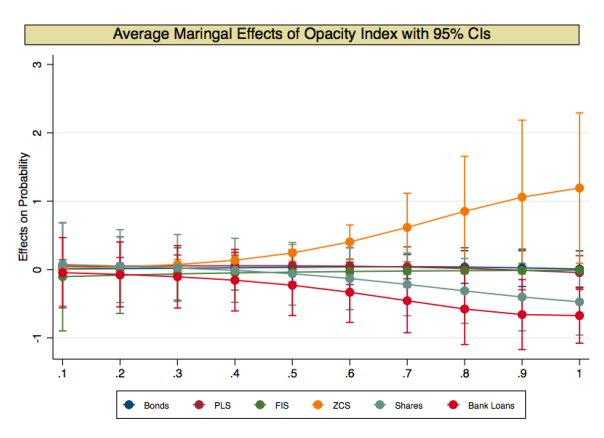
The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.18.: Marginal effects of opacity (sub-samples based on firm leverage level)

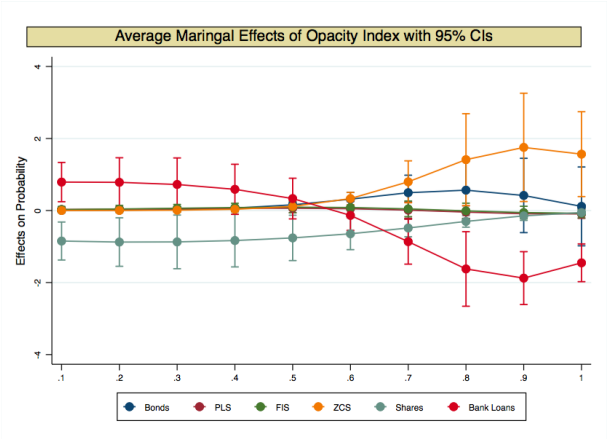
(a) Small Firms



(b) Medium Firms



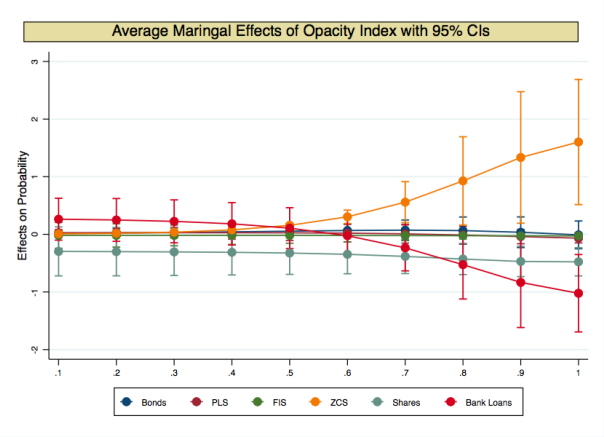
(c) Large Firms



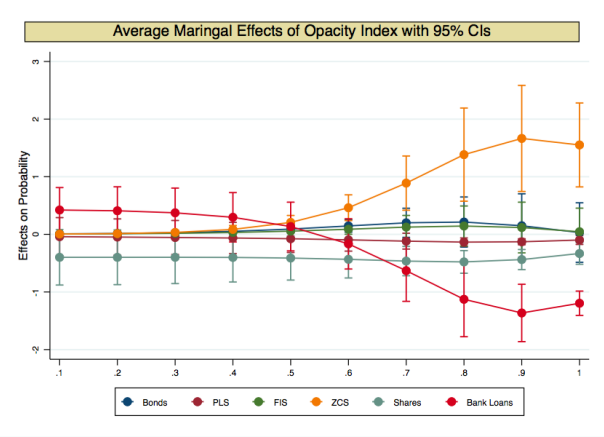
The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.19.: Marginal effects of opacity (sub-samples based on firm value)

(a) Positive Change



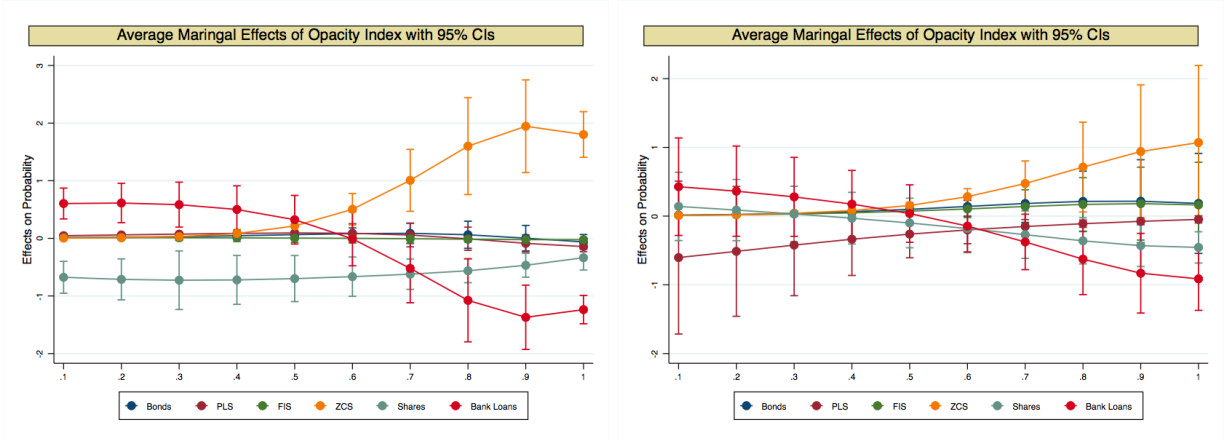
(b) Negative Change



The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.20.: Marginal effects of opacity (sub-samples based on investment opportunity)

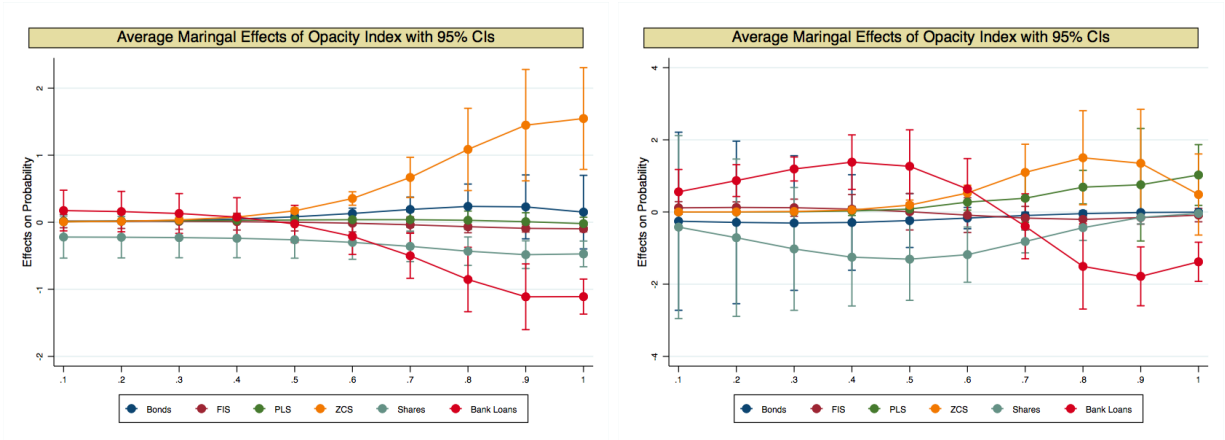
(a) Positive Invest. Opp. **(b)** Negative Invest. Opp.



The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

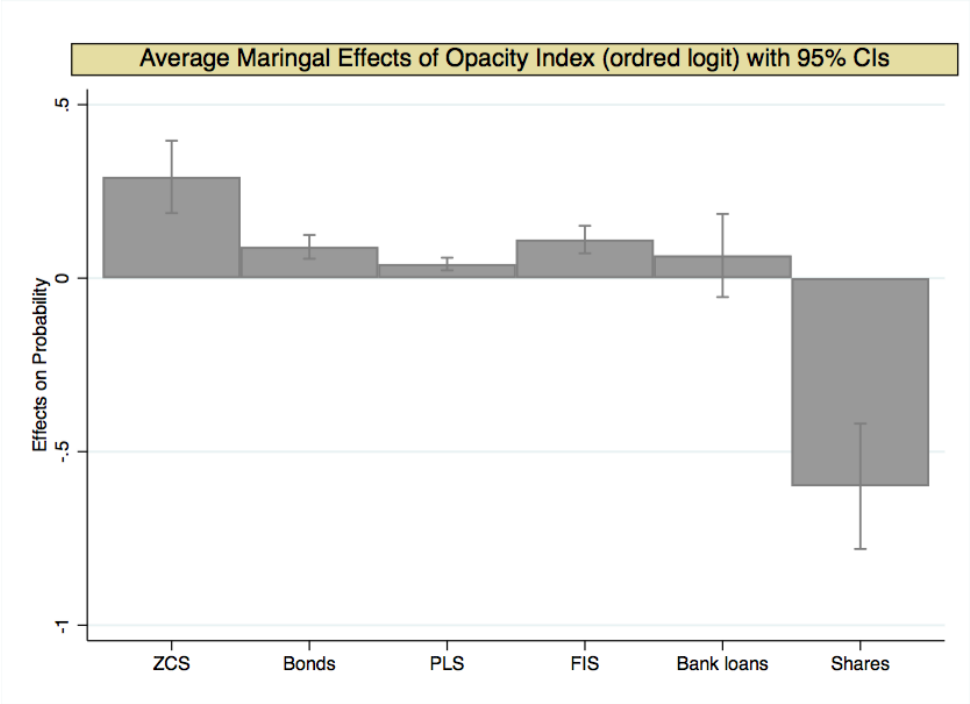
Figure II.21.: Marginal effects of opacity (sub-samples based on profitability)

(a) Profitable **(b)** Non-profitable



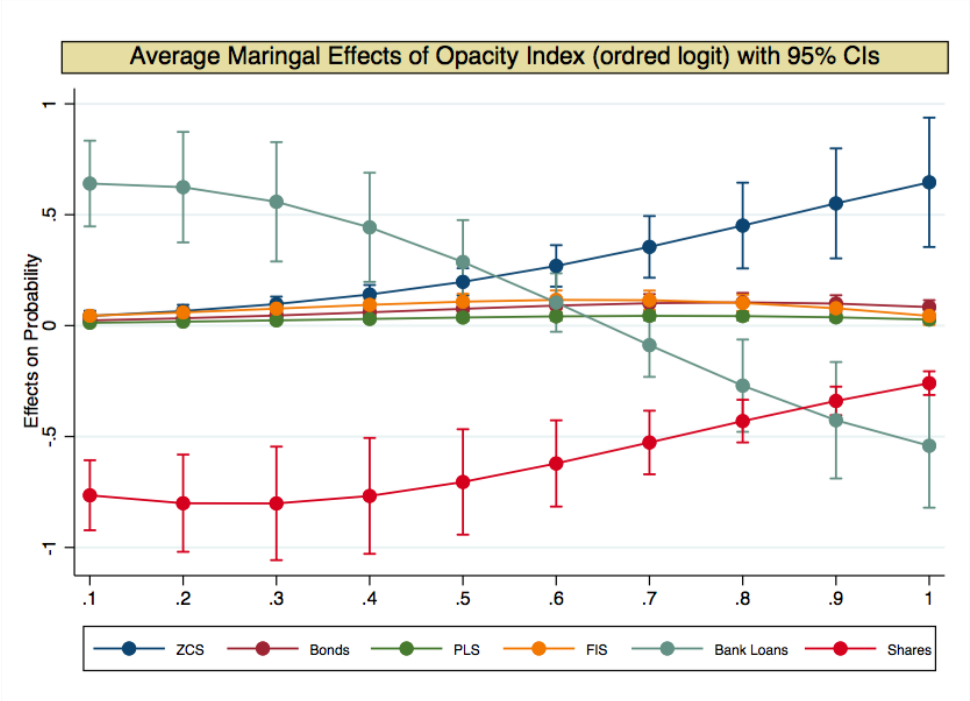
The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.22.: The average effect of opacity on the probability of issuing each funding instrument.



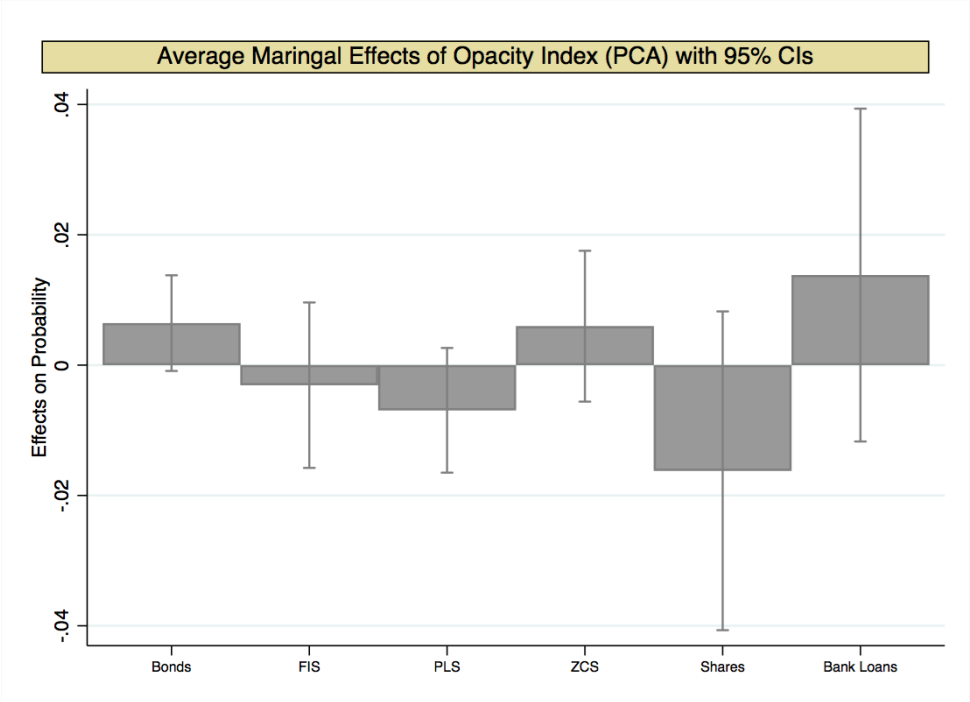
The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.23.: The average effect of opacity on the probability of issuing each funding instrument. The x-axis is opacity index and the y-axis is the average effect on probability.



The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Figure II.24.: The average effect of opacity on the probability of issuing each funding instrument.



The x-axis represent the external funding sources where: ZCS = Zero Coupon Sukuk, Bonds = Conventional Bonds, PLS = Profit-Loss Sharing Sukuk, Bank Loans, and Shares = Equity Shares.

Chapter III.

Islamic Securities in Corporate Financial Hierarchy

In this paper, we investigate the place of Islamic investment securities (sukuk) in firms' financial hierarchies using the modified pecking order theory. We study the external funding preferences of Malaysian firms using quarterly financial and accounting data of 112 firms for the period between 2005 and 2017. In particular, we first define two points in the pecking order hierarchy; the exhaustion of internal funds and maximum debt capacity. Then, from a basket of funding instruments, including bonds, equity and sukuk, we look at the firms' funding choice at each of the defined points. The choice indicates the level of adverse selection and information asymmetry involved in each instrument perceived by the firms compared to bonds and equity. We find that when internal funds are exhausted, firms prefer to issue profit-loss sharing sukuk over bonds and fixed-income sukuk are placed before equity beyond maximum debt capacity. The results show that sukuk can widen the external finance spectrum, which has important implications for policy makers in countries with dual financial systems.

Keywords: Corporate Capital Structure, Pecking Order, Islamic Finance, Sukuk, Emerging Markets

I. Introduction

The question of when a firm would choose a specific type of external financing is extensively discussed in the literature. This resulted in the prominent capital structure theories: namely, trade-off (Jensen, 1986), pecking order (Myers, 1984), market timing (Baker and Wurgler, 2002) and modified pecking order theories (Leary and Roberts, 2010). One key question is where to place the different types of Islamic investment securities (sukuk)[1] in firms' financial hierarchies. Available data show that at least 112 firms used both sukuk and traditional funding tools in parallel over the period 2005–2017, which negates the religious-motive contention. Faith-based financing would result in a sukuk-exclusive capital structure.

Sukuk is the sole capital market instrument in Islamic finance. It combines the features of debt and equity. The existing literature identifies the debt-equity characteristics of sukuk according to its structure. Specifically, fixed-income sukuk (FIS) are based on leasing and cost-plus sale transactions. They have pre-determined profit rates and nominal values. Their cash flows are independent of the firms' operations. Hence, FIS are debt-like. On the other hand, profit-loss sharing (PLS) sukuk are based on partnership arrangements, in which firms and sukuk-holders are partners in a specific project or asset. Sukuk proceeds depend on the performance of the underlying project. Profit is not guaranteed, and losses are shared between parties. Thus, they are similar to equity. Dual financial system economies accommodate both traditional and Islamic banking and finance systems, such as Malaysia, which is the scope of our paper.

In the literature, there are two conflicting views on this issue. According to the first view, sukuk are praised over bonds because of the compulsory requirements of a tangible asset and excessive contracting (Abdul Halim et al., 2017; Ebrahim et al., 2016; Grassa and Miniaoui, 2017). The advocates of this view claim that sukuk characteristics reduce information asymmetry and adverse selection. Adhering to Islamic guidelines, sukuk issuance requires transacting parties to specify a tangible asset, to establish a special-purpose-vehicle (SPV) and to transfer ownership rights to protect investors. The second view claims that the implementation mechanisms of sukuk lead to higher degrees of adverse selection and information asymmetry. Recent empirical work shows that sukuk attract firms with higher adverse selection and moral hazard. For example, firms can issue sukuk to move troubled projects outside their balance sheets via the SPV (Klein and Weill, 2016).

This paper aims to investigate the place of Islamic investment securities (sukuk) in firms' financial hierarchies, given that traditional funding instruments are also available. We examine external funding preferences for firms with access to an additional funding tool which is sukuk and adopt Leary and Roberts's (2010) model for our analysis. Our results show that firms prefer to issue profit-loss sharing sukuk over bonds and fixed-income sukuk over equity. Meanwhile, bonds and equity are not significant funding alternatives. We find that firms perceive the difference between sukuk types, conventional debt and equity.

[1]Defined as "certificates of equal value representing undivided shares in the ownership of tangible assets, usufructs and services or (in the ownership of) the assets of particular projects or special investment activity" (AAOIFI, 2008).

The extant literature has addressed this question; however, most of the studies have categorized firms into groups of sukuk issuers versus bonds issuers. The former group can then choose which type of sukuk to issue. Such analyses exclude the possibility of firms using sukuk, bonds and equity simultaneously[2]. By concentrating the comparison with bonds, this classification is also biased towards the debt features of sukuk. In this paper, we argue that treating sukuk as a substitute for conventional bonds is an obstacle to an accurate analysis of sukuk characteristics and application. Ignoring sukuk equity features can also lead to distorted conclusions. Therefore, we view bonds, equity and the different types of sukuk as a basket of capital market tools each used under certain circumstances.

In this study, we follow Leary and Roberts (2010) and first define two points in the pecking order hierarchy, which are the exhaustion of internal funds and maximum debt capacity. The two points represent constraints imposed on firms' funding deficit. The constraints define the three versions of the pecking order. In the strict specification, a firm is supposed to exhaust all available internal funds (savings = 0) before considering issuing bonds. Similarly, the issuance of equity is only justifiable if a firm debt ratio is equal to 1. In the semi-liberal and liberal specifications of the pecking order, the above conditions are relaxed. In the semi-liberal case, firms' minimum savings and maximum debt capacity are matched to the industry averages, whereas in the most liberal version, savings and leverage levels are firm-determinant. In each of the above cases, we examine firms' funding choices at the two defined points, given a basket of funding instruments, including bonds, equity and sukuk. The choices indicate the perceived adverse selection and information asymmetry involved in each instrument.

The literature finds evidence that the capital structure of firms in Asia-Pacific countries can be explained by a modified pecking order, where firms prefer to raise external funds via bank loans and equity over conventional bonds. Moreover, the theory works best in developing countries due to the higher degrees of information asymmetry and inefficient regulatory bodies (Chen et al., 2013; Chen, 2004; Ebrahim et al., 2014; Seifert and Gonenc, 2010). Scholars criticized the strict presumptions of the pecking order. They claim that an extended interpretation that integrates pecking order and trade-off models is more realistic. On such grounds, Leary and Roberts (2010) developed a model with three degrees of the pecking order, ranging from the strict assumptions proposed by Myers (1984), to a liberal version where firms' bond-equity choice is governed by information asymmetry and firm-determinant savings and leverage targets. We use Leary and Roberts's (2010) model modified for sukuk, which is the second original contribution of our paper.[3] We apply a theoretical framework to investigate corporate sukuk issuances. Recent studies use firm characteristics as indicators for capital structure theories (Abdul Halim et al., 2017; Grassa and Miniaoui, 2017; Klein and Weill, 2016; Mohamed et al., 2014; Nagano, 2017).

[2]As stated earlier, the Malaysian capital market data show that at least 112 firms used both sukuk and traditional funding tools in parallel over the period 2005–2017.

[3]Given that Islamic principles discourage the creation of debt, trade-off theory is not a realistic platform for this study. To use trade-off theory, we should be able to differentiate between Islamic and non-Islamic loans to be able to calculate leverage accurately. We do not have access to such information. The pecking order theory, on the contrary, is more suitable through information asymmetry analysis. It is also found to be more applicable for firms in emerging economies (Chen, 2004; Seifert and Gonenc, 2010; Zou and Xiao, 2006).

In our paper, we make no prior assumptions about the characteristics of sukuk. In other words, we do not assume that debt-like sukuk are closer to conventional bonds and that equity-like sukuk should follow shares. Each sukuk structure is an independent category. We categorize sukuk according to their structure as fixed-income sukuk, profit-loss sharing sukuk, and zero-coupon sukuk.[4] Although the structure-based classification of sukuk appears to be theoretically accurate, our results show otherwise. The findings demonstrate that debt-like (FIS) is comparable to shares, while the equity-like (PLS) sukuk are comparable to debt. Our findings show that it is inaccurate to establish a generalized rule about the merits and flaws of sukuk attributes. Firms' capital decisions significantly depend on the size of the deficit, the strictness of the pecking order specifications, and firm characteristics. We underline that firms prefer PLS sukuk over bonds and FIS over shares.

We conduct our investigation using a panel dataset comprised of 112 Malaysian firms operating in 10 sectors which had issued bonds, equity and sukuk concurrently over the 48 quarters covering the period between 2005 and 2017. The first part of the dataset includes bonds, equity and sukuk issuances information such as the issuance size, date, duration and outstanding amount for each firm in every quarter. The second part of the dataset incorporates firm-specific financial data such as asset size, capital, net income, sales, expenses and liabilities.

This paper contributes to two bodies of literature. First, it adds to the scholarship that empirically tests pecking order theories. For instance, Ebrahim et al. (2014) and Chen (2004) find that the capital structure of firms in Asia-Pacific countries can be explained by a modified pecking order, as firms prefer to raise external funds via bank loans and equity over bonds. We extend this literature by showing that firms prefer PLS sukuk over bonds and FIS over shares. Our empirical findings provide evidence in support of the modified pecking order in an Asia-Pacific dual financial system incorporating sukuk. The previous is in line with the findings of conventional corporate finance literature.

Second, we contribute to the literature on whether Islamic financial products require stricter regulatory requirements and supervision. Recently, Abedifar et al. (2018) underline that Islamic banks need greater direct supervision compared to conventional banks. El Qorchi (2005) emphasizes the importance of extending Islamic regulations and supervision beyond banks, to capital markets and other sectors. Our study shows that there is a need for redefining Islamic debt, equity and capital and to restructure the regulatory framework taking into consideration the unique structure of Islamic investment securities.

The conventional-Islamic literature synthesis, combined with sufficient data, leads to insightful results such as the ability to use conventional capital structure theories to rationalize sukuk issuances. It provides an empirical proof that firms distinguish between Islamic and conventional instruments and the different sukuk types. Finally, it facilitates empirically challenging the normative verdicts about sukuk debt-equity characteristics.

[4]FIS include: Murabaha, Wakalah, Ijarah, Istisna'a and Salam contracts. PLS include: Musharakah and Mudharabah contracts. Zero-coupon sukuk are short-term and non-tradeable fixed-income sukuk. A thorough discussion can be found in Chapter I.

This paper is divided into eight sections. In the next section, we present a brief background of the conventional capital structure theory in emerging markets, then we discuss the Malaysian capital market. Section 3 includes a review of the small yet growing Islamic corporate finance literature. We develop the testing model and econometric approach in Section 4. In Section 5, we describe our data. Sections 6 and 7 include results and discussion, respectively. In Section 8 we conclude our chapter.

II. Background

In this section, we present a brief literature review on conventional corporate capital structure and its implications in emerging markets. By doing so, we set the basis for our analysis of corporate sukuk. We then discuss the conventional and Islamic Malaysian capital markets.

I. Corporate Capital Structure

Building on the seminal work of Modigliani and Miller (1958), the corporate finance literature aims at explaining the heterogeneity of firms' capital structures and funding decisions. The ongoing research produced the two prominent theories of corporate structure: namely, the trade-off and pecking order theories.

The trade-off model assumes that firms evaluate debt benefits (tax shield) against debt costs (bankruptcy costs) when making capital decisions. Firms use debt as a tool to discipline managers and alleviate the agency problem of free cash flow. On the other hand, the pecking order theory ranks the three sources of funds relative to adverse selection and equity issuance signalling. Accordingly, retained earnings (internal resources) are firms' preferred source of funds as they involve no adverse selection and convey a positive signal about the firm. Debt is the firms' second choice. It is supposed to comprise minimal adverse selection. Equity is the last-resort financing tool. According to Myers and Majluf (1984), a firm should never raise funds through equity.[5]

The implications of the theories vary among economies and cultural environments. De Jong et al. (2008) assert that country-specific factors have a significant impact on firms' capital structure, leverage levels and other firm characteristics. Such factors include a country's GDP growth, bond market development and creditor rights protection. Also, they find that capital and legal formations have an indirect impact on firm leverage levels and debt-equity composition. Antoniou et al. (2008) document the discrepancy between firms' capital structure in market-oriented and bank-oriented economies. In a study of an international sample, Gungoraydinoglu and Öztekin (2011) find that country-specific factors explain one-third of the variation in the capital structure.

[5] A comprehensive review is provided by Frank and Goyal (2007, 2009); Harris and Raviv (1990) and Graham and Leary (2011).Others include Titman and Tsyplakov (2007), Flannery and Hankins (2013), Adam and Goyal (2008), Fama and French (2005), Rajan (1992), Leary and Roberts (2010), Lemmon et al. (2015), Graham et al. (2015), and Harris and Raviv (1990).

Nevertheless, the empirical investigation of corporate capital structure theories focuses on firms operating in the U.S. and other developed countries.[5] Few studies examine the capital structure of firms operating in emerging and developing markets. We highlight some of the main findings in the discussion below due to its applicability to our Malaysian sample.

Deesomsak et al. (2004) use firm- and country-specific factors to study corporate capital structure in Thailand, Malaysia, Singapore and Australia. They address mixed evidence of the pecking order and trade-off theories in all countries. They attribute the between-country differences to legal systems, corporate-ownership schemes, shareholders and creditor rights. For Chinese firms, neither the pecking order nor the trade-off theories are applicable (Zou and Xiao, 2006). However, Chen (2004) suggests a modified pecking order that starts with the preference to finance investments via internal funds, followed by the issuance of equity, bank loans and, finally, debt.

Seifert and Gonenc (2010) investigate the pecking order theory in 23 emerging markets and report that a large proportion of deficit is financed by equity. They confirm that countries with extremely high information asymmetry and agency costs adopt the pecking order theory. The regulations in emerging markets are not as strict about enforcing regular reporting compared to Western and developed economies. Also, the speed by which such reports are made available is rather slow. They reinforce the findings of Leuz et al. (2003) that manipulation of earnings information is more common than in developed economies. Besides, the number of analysts tracking firms is low. With respect to agency costs, managers in emerging markets are perceived to be more self-centered because they exploit firms' resources, consume perks and appoint unqualified human capital based on connections. Political orientation is another critical concern for firms' shareholders in emerging markets. Other studies examining the capital structure in emerging and developing countries include Demirgüç-Kunt and Maksimovic (1999), Booth et al. (2001) and Fan et al. (2012).

II. Malaysia

The Malaysian capital market has only existed since the late 1980s.[6] Despite its growth in the early 1990s, it is still considered a third option subsequent to issuing equity and bank borrowing (Suto, 2003). Also, 80% of the issuances were bank-guaranteed, and the secondary market was very narrow. Instead, banks play an important role in the Malaysian economy because of government policies that restrained the funding activities of corporations. To reduce agency costs, the government encouraged firms to maintain relationships with banks following the Japanese policy. That made banks more powerful in Malaysia.[7]

Among the few studies on the capital structure in emerging markets, Ebrahim et al. (2014) recently investigate Malaysian firms. Their sample consists of 751 firms for the period between

[6]It was established in 1987 as part of the government strategy to develop a private capital market. It was issuing and trading conventional bonds only at that point. During that period, bond issuances were merely private placements and not public offerings.

[7]Most primary banks hold shares in firms, creating solid relationships between the two parties (Suto, 2003). This provides easy access to loans, with minimal need for collateral and information disclosure. It also increases the demand for funds, which consequently reduces the effectiveness of bank-monitoring assuming government support.

1988 and 2009. They deduce capital structure via firm characteristics such as profitability, tangibility and growth.[8] The study aims to validate the trade-off theory using a partial adjustment model.

They report mixed evidence of the pecking order and trade-off theories, suggesting that both models are complementary. Supporting the pecking order theory, they find that profitable Malaysian firms have lower leverage ratios, preferring to utilize excess cash flow. Firms with higher market-to-book ratio do not face underinvestment problems and tend to have higher leverage ratios. The positive association between leverage and firm riskiness implies the existence of an adverse selection problem. The previous is in line with González and González's (2008) assertion about bank-concentrated credit markets.

They also show that firm tangibility reduces agency costs, especially for large firms. The positive association between tangibility and leverage levels indicates that large tangible firms have better access to the debt market. Besides, Malaysian firms adjust their leverage ratio toward the industry benchmark. The previous is consistent with the trade-off model.

In 2000, Islamic investment securities were introduced to the Malaysian capital market. This made an additional financing tool available. The size of sukuk issuance has been growing and competing with its conventional counterparts. In 2017, sukuk issuances were approximately USD 32.34bn against USD 25.734bn worth of conventional bonds issuances (Figure III.2). Interestingly, despite the religious motives to use sukuk, one can observe a concurrent pattern of the issuances of both instruments in the period 2013–2017 (Figure III.3).

The Malaysian government had the vision to become a global Islamic finance hub. It undertook a strategic plan to increase the share of Islamic banking assets to 20% of the total banking sector. In 2011, more than two-thirds of the listed shares on Kula Lumpur Stock Exchange were Sharia-compliant (by market cap).[9] Also, the presence of non-Muslim sukuk investors became substantial.[10] Therefore, analysing corporate financing decisions when sukuk is an option become a necessity to understand firms' capital structure in dual financial system economies. In the next section, we discuss Islamic corporate finance literature.

[8] Capital structure determinants demonstrated by Frank and Goyal (2009).

[9] Tax incentives are an essential aspect of achieving the Malaysian vision. Tax law treated Islamic and conventional transactions equally. For example, to avoid over-taxation, Islamic profits are assimilated to traditional interest, and profits from sukuk are tax exempted. Also, Islamic partnerships that are similar to venture capital are not considered partnerships from a tax perspective.

[10] The plan facilitated foreign investment by increasing the foreign equity participation cap to 70% compared to 30% in conventional banks. As a result, the majority of sukuk investors are non-Muslims.

III. Literature Review

The definition of sukuk highlights two unique features. First, similar to bonds, sukuk have a maturity date and periodic payments. Second, like shares, the certificates represent partial ownership in a specific asset or project. Conversely, sukuk periodic payments are not predetermined.[11] Also, the ownership is specific to a project or an asset (not the whole firm) and has a limited duration.

The combination of debt and equity characteristics of sukuk motivate researching and understanding how different these certificates are from conventional bonds and stocks. The literature investigates various areas such as sukuk credit ratings, yield to maturity, price co-movements, and the effect of sukuk issuances on firm value (Adesina-Uthman, 2015; Arundina et al., 2015; Godlewski et al., 2013; Raei and Cakir, 2007; Said and Grassa, 2013). Recently, examining sukuk in light of corporate structure theory is receiving attention; not only because of the unique structure of sukuk, but also due to the escalating value and number of sukuk issuances and data availability.

In our paper, we use a theoretical framework of the pecking order theory to examine corporate sukuk in Malaysia. The theory's assumptions make a clear cut between the characteristics of debt and equity. Therefore, it enables us to achieve our aim to (1) classify sukuk among the conventional funding instruments along the Myers hierarchy and (2) examine the market perception of the different types of sukuk. The few available studies infer capital structure implications from firm characteristics. They also compare bond issuers to sukuk issuers. None of the studies consider equity issuances. In the following, we elaborate on the available studies, approaches utilized and the main findings.

Ebrahim et al. (2016) develop a theoretical model to prove the optimality of authentic Islamic products to reduce information asymmetry and agency costs. They assert that Sharia principles stipulate mitigating information asymmetry through its prohibitions. The principles interdict the creation and trading of debt, while they promote transacting via tangible assets. They emphasize that Islamic transactions do not transfer risk to the weaker party. The transactions also provide better documentation and transparency as they represent a physical attribute that can be priced easily. Ebrahim et al. (2016) underline that the creation of debt and failing to control for high uncertainty are the formula for financial system fragility.

Nagano's (2010) work is the first attempt to examine sukuk issuances in light of corporate finance theory. The author provides the first evidence that the determinants of Islamic borrowing (banking and sukuk) are different from conventional lendings. Results suggest that firms issue sukuk due to the desire to enter a new, ethical capital market, which enhances firms' value. The study's sample consists of Malaysian sukuk issuances, bank borrowings from the GCC countries, in addition to traditional financing from both regions. Shahida and Saharah (2013) extend the attempt to identify the determinant of firms preferring to issue sukuk over conventional bonds. The paper considered several firm characteristics as potential factors such as firm size,

[11] Periodic payments can be determined under Ijarah (lease) and Murabaha (cost-plus sale).

government incentives and previous sukuk issuances. Haron and Ibrahim (2012) applies partial adjustment models and reports comparable observations. Similarly, Hanifa et al. (2014), in their conference paper, utilize partial adjustment models to find the determinants of firms debt target ratio and its dynamic adjustment behaviour for the issuances of sukuk and its sub-categories. The authors state that the trade-off benefits for sukuk issuers are different than those of bond issuers. The results also underline that sukuk issuers are small firms with higher growth prospects and tend to adjust their debt ratios frequently.

Islamic investment securities have three features that – at least theoretically – reduce agency cost, as asserted by Abdul Halim et al. (2017). The three features are exhaustive contracting, asset definition and the inclusion of SPV's. Sukuk structure includes layers of contracts defining the role of parties over the certificate duration. Also, it identifies the underlying asset or project. The asset can also be assigned as collateral. The existence of a remote SPV being responsible for profit distribution minimizes default probability. The study argues that these characteristics encourage firms to raise leverage and remain solid against market shocks by reducing agency costs and the cost of underinvestment. Thus, corporations prefer to issue sukuk over conventional bonds when in need of funds.

Abdul Halim et al. (2017) quantify agency costs, financial distress and information asymmetry of Malaysian firms, to explore preference toward conventional bonds against sukuk. Results show that as agency costs and growth opportunities increase, firms lean toward issuing sukuk. Firms with shareholders from government-linked investment companies prefer to issue sukuk over conventional bonds. The latter is evidence of the Malaysian government's strategy to support Islamic capital markets. However, results do not explain firms' choices among available sukuk types. In addition to the previous, Azmat et al. (2014) report that firm profitability and riskiness have a deterministic role in Malaysian firms' bond-sukuk choice. Also, firms' Sharia committees and the AAOIFI (Accounting and Auditing Organization for Islamic Financial Institutions) announcements have a positive and significant impact on sukuk issuances.

Likewise, Mohamed et al. (2014) examine Malaysian firms target-debt-optimizing behavior and funding decisions. They use lagged levels of sukuk and bonds to proxy for speed of adjustments. The study documents that Malaysian firms adjust to their sukuk target levels faster than their bonds' levels. Growth opportunities and firm size are the only factors affecting firm funding instrument choice. Nagano (2017) expands the study scope to include Indonesia, Saudi Arabia and the United Arab Emirates. The author uses firm size to establish a proxy for the pecking order theory where larger firms prefer equity, sukuk and bonds are ranked last. The findings show that firms issue sukuk when stocks are undervalued, thus, following market timing theory. All findings are pre-conditioned on firms' accessibility to the sukuk market.

Following the same research stream, Grassa and Miniaoui (2017) investigate corporate sukuk in the Gulf Cooperation Countries (GCC). Replicating Abdul Halim et al. (2017) and Azmat et al. (2014), they apply system GMM and logistic regression models to underline determinants of corporate sukuk issuances. The GCC region is known for its substantial sovereign sukuk compared to corporate sukuk. Consequently, sukuk observations represented 23.4% of the sample, while

the rest embodies conventional bonds. Results demonstrate that un-rated and highly leveraged firms prefer sukuk over conventional bonds. Further, the increase in the share of institutional shareholders adversely affects firms' sukuk issuances. The Dubai real estate crisis had a negative and significant impact on sukuk financing in the region. Factors such as asset tangibility and growth opportunity are significant and in line with the pecking order theory. The authors also look at the determinants of equity-like and debt-like sukuk issuances, and record no difference between the drivers of issuing both sukuk types.

According to Godlewski et al. (2016), the Malaysian market recognizes sukuk and its different structures as a distinct instrument. They find that issuing sukuk overall sends negative signals to the market. However, the signal is more negative when profit-loss sharing sukuk are issued.

Klein and Weill (2016) argue that, in practice, sukuk characteristics can be interpreted differently. First, firms with higher information asymmetry issue sukuk because they are unable to obtain funds in the bond market. Also, the complexity of the sukuk structure increases its ambiguity and requires professional expertise to evaluate and monitor. Second, a feature such as the SPV attracts riskier and less profitable firms to issue sukuk. Troubled firms have motives to transfer their less profitable projects to the SPV and enjoy artificial profitability, considering that SPVs are not required to provide financial disclosures. Ebrahim et al. (2016) explain that Sharia principles are not correctly implemented, causing the persistence of moral hazard and adverse selection problems.

Other approaches are used to examine the choice of issuing sukuk. For example, Ahmed et al. (2018) investigate why firms issue sukuk by looking at the investor reactions to the issuance of sukuk. They apply a market model event study in addition to logistic regressions. Similar to Godlewski et al. (2016), they report an adverse market reaction to the issuance of sukuk. Investors reactions are governed by the growth and earning prospectus of issuing firms. The authors justify investors adverse reaction based on the fact that profit-loss-sharing are similar to equity. Moreover, the sukuk is more accessible compared to the bond market, which allows troubled firms to issue sukuk. However, financially sound firm choose to issue sukuk as an alternative to conventional bonds, while financially troubled firms issue sukuk because of the difficulty to enter the bond market.

In Malaysia, where the conventional and Islamic financial systems operate in parallel, the economic and legal terms of bonds and sukuk are quite similar, and their yields are comparable (Krasicka and Nowak, 2012). Also, the median returns for each instrument are not statistically different from each other. Empirical analysis shows that the co-movement between sovereign Islamic and conventional bonds is very high (correlation = 0.95), while it is weak between corporate sukuk and conventional bonds (correlation = 0.32). The latter is due to sukuk illiquidity.

The variation in returns (between bonds and sukuk), if any, is attributed to (1) the economic conditions, (2) whether the instrument is debt or equity and (3) the issuing organization. The instrument being sukuk or bonds explains very little of the return variation. Studies show that sukuk are more sensitive to market conditions. Therefore, religious incentives are not elemental to tap the Islamic capital market. On the other hand, Islamic institutions and charities are

not able to raise funds via traditional means. That increases demand for sukuk, pushing down issuing costs and making Islamic securities more attractive.

IV. Hypotheses

In this paper, our goal is to investigate firms decisions to issue sukuk, given the availability of other traditional instruments. We acknowledge the different degrees of debt-equity characteristics in different sukuk structures; however, we make no prior assumptions. We fill the gap in the literature by employing a theoretical framework of the pecking order theory, in addition to the previously discussed ratio-based techniques. We evaluate firms' funding decisions at different pecking order thresholds. We include all sukuk types without any assumptions about their structure being debt-like or equity-like.

The pecking order theory demonstrates a clear-cut distinction between debt and equity-based on information asymmetry. Islamic investment securities combine the features of debt and equity; hence, the evaluation of information asymmetry is not straightforward. The literature shows mixed evidence about the distinction between sukuk types. While it is observable in the stock market reaction (Godlewski et al., 2011), it is not as clear in corporate finance theory studies (Grassa and Miniaoui, 2017). Therefore, to place sukuk types in firms' financial hierarchies we use a two-stage pecking order framework developed by Leary and Roberts (2010). We intend to understand when and under which circumstances firms issue each type of sukuk.

We incorporate sukuk types into the framework based on their technical features of being debt-like or equity-like. Each stage is defined by a threshold justifying the use of debt or equity. The first stage is when firms exhaust their internal funds and need external financing. According to Sharia principles and the above discussion, sukuk, in general, promote transparency and entail lower degrees of information asymmetry (Abdul Halim et al., 2017; Ebrahim et al., 2016; Grassa and Miniaoui, 2017; Mohamed et al., 2014). From this perspective, we formulate our first hypothesis in this stage of the framework:

H_{0a1}: Firms with higher information asymmetry are more likely to issue sukuk than conventional bonds.

However, differences persist among sukuk structures. To facilitate the discussion, we categorize sukuk into three groups based on the underlying contracts: (1) profit-loss sharing, (2) fixed-income sukuk and (3) zero-coupon sukuk. The latter two structures possess more debt features such as pre-determined periodic payments. They are similar to lease and installments-sale contracts. On the other hand, PLS sukuk have more equity characteristics, and they are deemed to be the most Sharia-compliant. They are partnership arrangement between parties. Scholars assert that PLS contracts involve more adverse selection and information asymmetry compared to fixed-income sukuk. In PLS financing arrangements, the entrepreneur has more information about the project compared to the investor. Further, the disclosure of such information depends on the entrepreneur. This issue of information disclosure is vital at the time of contracting and at later stages of performance reporting. Another problem with a PLS contract is its inability

to demand collateral. According to Sharia principles, equity-based contracts cannot require collateral. Hence, our second hypothesis in the first stage of the framework is:

H_{0a2}: Firms with higher information asymmetry are more likely to issue profit-loss sharing sukuk than fixed-income and zero-coupon sukuk.

In the second stage of the pecking order framework, firms exhaust both their internal funds and maximum debt capacity and require external financing. As we find no literature examining the equity characteristics of sukuk, we adopt the argument of Myers and Majluf (1984) that issuing shares involves the highest degree of adverse selection and firms – theoretically – should never issue shares. Our hypotheses at this stage are:

H_{0b1}: Firms with higher information asymmetry are more likely to issue sukuk than equity.

H_{0b2}: Firms with higher information asymmetry are more likely to issue profit-loss sharing sukuk than fixed-income and zero-coupon sukuk.

In the next section, we present our econometric approach, which is based on the model of Leary and Roberts (2010) to test the choice of sukuk in different specifications of the pecking order theory while incorporating some of the trade-off model implications.

V. Methodology

This paper investigates the place of sukuk in firms' financial hierarchies given the availability of traditional funding means. We take into account the debt-equity hybrid of sukuk structures. We apply a framework developed by Leary and Roberts (2010). The authors criticize the static interpretation of corporate capital structure theories and suggest that allowing flexibility in modeling and hypothesis interpretation can enhance the accuracy of empirical analysis. They assert that the pecking order and trade-off theories are complementary and together they constitute a modified pecking order. Based on Myers and Majluf's (1984) hierarchy, the model accommodates three versions of the pecking order theory. Each version embodies a certain strictness level of the theory. Two of the three cases are less strict and allow for interpretations in light of the pecking order and trade-off models. Given its rationale, in this paper we postulate that a modified form of the model can encompass sukuk and test firms' capital structure.

Myers and Majluf (1984) underline that, due to information asymmetry, firms prefer to use their internal funds to finance their new positive investment opportunities (Figure III.1). When firms depleted their internal funds, the issuance of conventional bonds is justified (Figure III.1 – point C). Likewise, the issuance of equity is only rationalized if the investment size is large, and firms' maximum debt capacity is unable to cover it (Figure III.1 – point D).

Leary and Roberts (2010) quantified points C and D to specify two thresholds: α^C and α^D. The point at which firms' internal funds (savings) are exhausted and firms rationally start to use debt is α^C. In the strict pecking order, firms will use all internal funds before issuing debt, therefore $\alpha^C = 0$. Further, α^D is the firm's maximum debt capacity measured by the debt

ratio.[12] Reaching α^D is what determines "when" a firm can rationally issue equity. In the strict pecking order, α^D is equal to 1. In the semi-liberal pecking order, the conditions are relaxed; firms' cash holdings and maximum debt capacity are held at the industry level. In the liberal version, both thresholds are firm-determinant. We demonstrate the cases thoroughly in the next section.

The model is appropriate for this study because thresholds are data-implied. As there are no established theoretical thresholds for the timing and volume of sukuk issuances, the model facilitates the assessment of sukuk at the different stages of the financing hierarchy. The model also defines a range of pecking order degrees and specifies thresholds controlling for the use of each funding source by distinguishing between debt and equity. That broadens the test scope and adds flexibility. Conversely, previous Islamic finance capital structure studies use financial ratios solely to proxy for capital structure theories.

In the following section, we present the two-stage model pecking order theory with three strictness degrees. The model is modified to account for sukuk as a funding option.

I. Leary and Roberts (2010) Model Modified for Sukuk

Stage 1

The first stage of the model is defined by the first threshold, α^C. In a strict pecking order theory, a firm is supposed to exhaust all available internal funds before it considers issuing external funds. On such a basis, Leary and Roberts (2010) establish a firm's lower bound of savings. A firm is only going to issue debt if:[13]

$$\text{Investment} - [\text{Internal funds} - \alpha_{it}^{C}] > 0 \tag{III.1}$$

Implying that:

$$\alpha_{it}^{C} > [\text{Internal funds} - \text{Investment}] = \alpha_{it}^{C(min)} \tag{III.2}$$

Where $\alpha_{it}^{C(min)}$ is the lower bound of savings. In essence, using external funds is only justified under pecking order theory when the saving requirement is greater than the lower bound of savings. Ranging from a strict to a liberal pecking order theory, the definition of the lower bound of saving will change as well.

- **Case 1:**
  $\alpha_{it}^{C(min)} = 0$ (Firms do not keep any savings; savings = internal funds = 0)

[12] Debt ratio = (TD/TA) = total debt/total asset.

[13] All quantities are scaled by total assets and calculated following Leary and Roberts (2010):

- Investment = Capital Expenditure + Change in Investment + Cash Paid for Acquisitions + Sale of Investments and Property Investments + Other Investment Activities
- Internal Funds = Cash + Cash Flow − Total Dividends Paid - Change in Working Capital
- Cash Flow = Income before Extraordinary Items + Depreciation and Amortization + Extraordinary Items + Deferred Tax + Cash from Other Operating Activities

- **Case 2:**
  $\alpha_{it}^{C(min)}$ = current cash balance + median of cash balance of firms in the same industry-year combination

- **Case 3:**
  $\alpha_{it}^{C(min)}$ = current cash balance + median of historical cash balance of the same firm

Case 1 assumes a strict pecking order specification, where the firm does not keep any savings. It uses all its internal funds before seeking external funds. Case 2 is a semi-liberal version of the pecking order. The firm decides to keep savings that are equal to the industry's average. In the last case, the firm follows a more liberal pecking order theory, where the savings are firm-determinant.
A firm decision on which type of external funds to use when needing to undertake a new investment can be described as:

$$Extfunds_{it} = \alpha_{it}^{C(min)} + \beta \sum_{k=1}^{K} X_{kit-1} + \epsilon_{it} \tag{III.3}$$

Where $\alpha_{it}^{C(min)}$ is the lower saving bound of the firm in the tested case, while the term $\sum_{k=1}^{K} X_{kit-1}$ includes k lagged firm characteristics as determinants of capital structure and ϵ_{it} is the error term. $Extfunds_{it}$ is a multinomial dependent variable with the categories of external funding tools, defined as follows:

$$Extfunds_{it} = \begin{cases} 1 & \text{Conventional Bonds} \\ 2 & \text{PLS Sukuk} \\ 3 & \text{FI Sukuk} \\ 4 & \text{ZC Sukuk} \\ 5 & \text{Bank Loan} \\ 6 & \text{Do Nothing} \end{cases} \tag{III.4}$$

Where PLS is profit-loss sharing, FI is fixed income and ZC is zero-coupon.

The dependent variable $Extfunds_{it}$ of each firm in each quarter takes a single value designated to the funding source. It would take values 1, 2, 3 or 4 if the firm issued bonds or any type of sukuk. $Extfunds_{it}$ takes a value of 5 if the change in long-term debt is greater than 5%. Finally, the dependent variable takes a value of 6 if a firm's internal funds are negative and the firm did not use any alternative external funding source.

Stage 2

According to the strict version of the pecking order theory, a firm will never issue equity. However, a less rigorous interpretation would consider equity financing as the last funding resort for a firm. Thus, if a firm exhausted its savings and is only able to borrow through issuing junk bonds, the issuance of equity is justifiable. That takes place at point "D" on the Myers

hierarchy (Figure III.1). It is quantified by Leary and Roberts (2010) to represent the point at which a firm reaches its upper bound of debt capacity α^D. At that point, the issuance of equity is justifiable. That being the case, a firm would issue equity only when:

$$\text{Investment} - \left[(\text{Internal funds} - \alpha_{it}^C) + \alpha_{it}^D - Debt_{t-1}\right] > 0 \tag{III.5}$$

Which implies that:

$$\alpha_{it}^D < \text{Investment} - [\text{Internal funds} + \alpha_{it}^C + Debt_{t-1}] \equiv \alpha_{it}^{D(max)} \tag{III.6}$$

Where $\alpha_{it}^{D(max)}$ is the upper bound of debt capacity. Similar to the first stage, depending on the degree of strictness of the pecking order theory, capital structure decisions beyond debt capacity are also looked at across three stages:

- **Case 1:**
  $\alpha_{it}^{D(max)} = 1$ (debt capacity = debt ratio = 1)
- **Case 2:**
  $\alpha_{it}^{D(max)}$ = debt capacity is equal to the debt ratio of the industry's investment-grade companies
- **Case 3:**
  $\alpha_{it}^{D(max)}$ = debt capacity can vary according to the firm's needs. Calculated as the annual average debt ratio of the firm

The first case indicates that a firm will utilize its maximum debt capacity, that is its total debt to total assets ratio, (TD/TA) = 1. In the second case, a firm would issue debt up to a certain level equal to the debt ratio of the industry's investment-grade firms. Case 3 is the most liberal version of the pecking order, where the maximum debt capacity is firm-determinant. At this stage, we attempt to explore what type of sukuk a firm would issue when its investment cost exceeds the firms' debt capacity upper bound. A firm's decision to issue equity can be described as:

$$Extfunds_{it} = \alpha_{it}^{D(max)} + \beta \sum_{k=1}^{K} X_{kit-1} + u_{it} \tag{III.7}$$

Where $\alpha_{it}^{D(max)}$ is the upper debt capacity bound of the firm in the tested case, while the term $\sum_{k=1}^{K} X_{kit-1}$ includes k determinants of capital structure and u_{it} is the error term. $Extfunds_{it}$ is a multinomial dependent variable including the categories of external funding tools other than conventional bonds and bank loans, defined as follows:

$$Extfunds_{it} = \begin{cases} 1 & \text{Equity Shares} \\ 2 & \text{PLS Sukuk} \\ 3 & \text{FI Sukuk} \\ 4 & \text{ZC Sukuk} \\ 5 & \text{Do Nothing} \end{cases} \tag{III.8}$$

Where PLS is profit-loss sharing, FI is fixed-income, and ZC is zero-coupon.

The outcome from Stages 1 and 2 would underline the possible ranking of sukuk along the Myers hierarchy. Also, it would highlight the conditions and firms' characteristics under which Islamic finance funding tools are issued. In the next section, we discuss firm characteristics we employ as capital structure determinants. A summary of variables definitions is presented in Table III.3.

II. Capital Structure Determinants

In addition to the fundamental pillars of corporate structure theories, the literature emphasizes the role of firms' business activities and financial characteristics in capital decisions. Leary and Roberts (2010) use firm characteristics suggested by the well-known work of Frank and Goyal (2009). Both studies empirically prove that such factors shape firms' capital structure. We employ comparable factors contingent on data availability (Table III.3).

The first factor is the firm size. It is measured by the natural logarithm of total assets. The relationship between firm size and capital structure is not clear, as shown in many empirical studies. The inference is primarily based on the correlation between leverage and firm size. Scholars argue that larger firms are more stable and have smaller failure probabilities. Hence, they face no constraints to lever up. Information about larger firms is accessible to the public, which results in favoring equity issuance. Pecking order theory predicts a negative relationship between firm size and leverage. It relates firm size to its age, and argues that such firms have the opportunity to retain earnings.

The impact of firm size on sukuk issuance is equally blurred (Abdul Halim et al., 2017; Azmat et al., 2014; Nagano, 2016). Larger firms can effortlessly tap the bond market, while it is difficult for smaller firms, which motivates such firms to issue sukuk. However, in our study, as we show later, small firms prefer to obtain funds from bank loans. We also find that large firms prefer PLS sukuk. They also issue bonds and fixed-income sukuk with comparable probabilities.

The influence of profitability is equally controversial. Pecking order theory indicates that profitable firms prefer to use internal funds to finance potential projects. However, Jensen (1986) argue, that under efficient market control, a firm will be forced to commit to using leverage to pay out cash. Besides, the advantage of the tax-shield motivates firms with low financial distress cost. Pecking order theory endorsing internal over external funds suggests that leverage levels decrease if dividends and investments are constant (Frank and Goyal, 2009).

Klein and Weill (2016) assert that the sukuk issuance is negatively related to profitability. Thus, sukuk issuers are usually low performers. The authors believe it is logical that a less profitable firm would find sukuk an attractive mode to raise funds and transfer bad projects outside the balance sheet. We measure profitability as the ratio of earnings before interest, taxes, and depreciation (EBITD) to total assets, and net income to total assets. We report similar findings in the liberal pecking order case, where unprofitable firms prefer to issue fixed-income and zero-coupon sukuk. Profitable firms prefer to raise funds via bank loans.

The third factor is firm growth or investment opportunity. We use the ratio of market to book ratio to proxy for firm growth. Adam and Goyal (2008) demonstrate that the market to book ratio is the most reliable method compared to other measures such as the ratio of capital expenditure to total assets and the change in firm size. The pecking order theory predicts a positive correlation between debt utilization and growth opportunities, given constant profitability levels. On the other hand, the trade-off theory argues that investment opportunities decrease debt levels in growing firms. Such firms prefer to issue equity because of the increase in financial distress costs, and it tends to place a higher value on shareholders.

In terms of sukuk, Klein and Weill (2016) document that the rise in the market to book ratio increases information asymmetry, and consequently motivates firms to issue sukuk. In our analysis, the influence of firm growth varies across sukuk types. An increase in the market to book ratio increases the probability of issuing fixed-income sukuk. However, the probability of issuing zero-coupon sukuk decreases.

Tangibility is the fourth capital structure determinant. The ratio of fixed assets to total assets has various economic interpretations, as the pecking order theory suggests. It argues that greater tangibility decreases leverage levels. That is because higher levels of fixed assets reflect low information asymmetry encouraging firms to issue equity. Likewise, a considerable portion of fixed assets decreases adverse selection, making debt easily accessible. Pecking order theory predicts a positive effect of the size of tangible assets on leverage levels. Trade-off theory adopts an opposite view. Fixed assets concentration serves as collateral, and its market valuation is relatively more straightforward. Thus, acquiring debt becomes easier. The opposite is true for intangible assets.

As tangible assets are a mandatory requirement for sukuk issuance, firms with high tangibility are expected to turn to the sukuk market. Also, less collateralized firms are considered riskier and might tap the sukuk market. Such firms find it difficult to access other funding markets (Klein and Weill, 2016). Our results show that tangibility is not significant in the decision between bonds and sukuk. However, it is significant when firms choose between sukuk and equity. Tangible firms prefer to issue fixed- income and zero-coupon sukuk. PLS sukuk is the choice of intangible firms.

We also use the current ratio to measure firms' financial distress caused by excess levels of debt. Firms with a low current ratio issue sukuk less often because they are not financially distressed. On the contrary, high levels of the current ratio might also result in more sukuk

issuances because of the shortage of short-term debt (Klein and Weill, 2016). We find that firms with a low current ratio issue PLS sukuk. However, they also approach banks.

VI. Sample

Malaysia provides ideal scope for our study. It is home to 60% of the total global corporate sukuk. It hosts a dual financial system that is optimal to examine corporate capital decisions. In addition, data quality and availability are better than other Islamic capital markets.

We build a panel dataset comprised of 112 Malaysian firms over the period 2005–2017.[14] Quarterly time intervals are a novelty to our paper. Our data has 40 quarters (T = 40). We include all firms which issued sukuk at least once during that period. We draw sukuk and bond data from Bloomberg. We specifically obtain information about sukuk issuance date, the amount issued, the amount outstanding, contract type and maturity. We use data on equity issuances and quarterly financial results from Compustat Global, SNL Financial and Bloomberg.

The initial sample consists of 399 firms and 3,763 sukuk issuances. We filter the dataset for financial, government-owned and private limited companies. That results in our sample of 112 firms and 1,046 issuances. Since a considerable number of firms issued sukuk more than once in a specific quarter, we summed values of issuance and averaged duration. The previous technique is the most appropriate approach to obtain one observation per quarter without forfeiting valuable information. The compressed number of issuances is 431. Table III.1 shows the number of fixed-income and zero-coupon sukuk issuances is identical (approximately 42% of total sukuk issuances), while profit-loss sharing sukuk represent 15%. Together, sukuk account for 16.5% of total external financing. The frequency of obtaining bank loans is the highest, followed by issuing equity. Bond issuances are the smallest. We exclude observations of multiple funding resources in a single quarter. Firms in the sample operate in ten sectors (Table III.2). Our dataset is winsorized at the 10% and 90% levels to control for outliers.

I. Sukuk, Bonds and Equity

The frequency of issuing sukuk is the highest in the period before and during the sub-prime crisis. It declined after 2011, which could be due to the drop in oil prices. Nevertheless, data show that sukuk issuance picks up toward the end of the sample period. Even though the Malaysian government had strategic plans to develop conventional and Islamic capital markets simultaneously, our data show that the frequency of issuing bonds is the lowest. Using equity to raise funds surged after the global financial crisis. Bank loans are the most popular external funding source for firms in our sample. Amounts raised through each funding instrument are comparable (Figure III.4).

Sukuk are classified into three groups: fixed-income, profit-loss sharing and zero-coupon sukuk. Zero-coupon sukuk are the most utilized external financing source, followed by fixed-income

[14] Before 2005, corporate sukuk issuances were modest. Sukuk offerings were mainly sovereign and quasi-sovereign.

sukuk and conventional bonds and, finally, PLS sukuk. As shown in Figures III.4 and III.5, zero-coupon sukuk were mostly used between 2005–2011. The frequency of issuing fixed-income sukuk has a positive slope. Amounts raised via FIS and PLS sukuk are comparable.

At the sector level, bonds issuance is more common in the telecommunication and utility firms. Energy and consumer discretionary firms issue more conventional bonds. The issuance of bonds is quite minimal in sectors such as healthcare, consumer discretionary and consumer staples. Industrial firms show a small difference between volumes of sukuk and bonds. However, firms that operate in the utility sector issue larger amounts with fixed-income sukuk. Real estate and telecommunication firms raise large funds via profit-loss sharing sukuk.

Malaysian firms raised almost USD 43.36bn with more than 1,000 sukuk issuances. Firms in the sample actively issued different types of sukuk over the 12 years. Seven types of sukuk are specified in the sample. Data demonstrate that zero-coupon sukuk have the highest frequency of issuance, followed by Murabaha and Musharakah sukuk.[15] However, in terms of volume, Wakalah sukuk account for the largest sukuk. Other sukuk structures are almost equivalent in value. Murabaha, Musharakah and Ijarah sukuk are the most popular. The pattern of the zero-coupon and Wakalah sukuk issuances can imply that the two instruments are possible substitutes. The issuance of Mudharabah appears to be seasonal.

II. Malaysian Firms

The data suggest that large firms lean toward sukuk, while medium and small firms prefer bonds. Also, zero-coupon sukuk are usually used by small and medium firms. Mudharabah sukuk, on the other hand, are mainly used by medium-sized firms. The use of Ijarah sukuk is concentrated within large firms. The relationship between size and type of sukuk varies between sectors. Small firms in the material and industrial sectors mainly issue zero-coupon sukuk. In the consumer staples sector, as firms grow larger, the issuance of sukuk decreases. Zero-coupon sukuk are the only type of sukuk written in the technology sector. The industrial sector, on the contrary, utilizes all types of sukuk.

On average, Malaysian firms included in this study are not heavily leveraged. Sectors such as materials, consumer discretionary, and consumer staples have stable and low leverage levels. Technology and healthcare sectors have a decreasing leverage ratio pattern. Energy and utilities are the highest leveraged sectors. Real estate firms, tangibility is less than 20%. Energy, consumer staples and telecommunication sectors have a high concentration of fixed assets. Irrespective of sectors, firms appear to be within the same profitability range. It is mostly stable, but it declines towards the end of the research period. On average, technology firms' returns fluctuates the most. The healthcare sector has the highest book to market ratio, as well as the one that fluctuates the most. The book to market ratio of telecommunication sector increases over time (Table III.4).

[15] Sukuk contracts are discussed in details in Chapter I.

VII. Inference and Results

This paper seeks to position sukuk among traditional funding instruments in view of capital structure theory. We examine firms' decisions to raise funds via sukuk given the availability of bonds, equity and bank loans. We find evidence that it is possible to rank the different sukuk contracts among traditional instruments given the pecking order thresholds and other capital structure determinants. Our analysis shows that firms prefer to issue PLS sukuk when internal funds are exhausted and issue FIS beyond maximum debt capacity. Moreover, conventional debt and equity are not significant funding alternatives for Malaysian firms.

We address our results from two pecking order specifications: semi-liberal and liberal. In both cases, the assumptions of the pecking order are relaxed. In the semi-liberal specification, firms' savings and debt capacity are maintained at the industry average. The liberal specification allows firms to determine the size of savings and maximum debt capacity individually. We do not discuss our results from the strict version of the pecking order. Imposing the strict conditions on the sample results in a random mass of quarter-firm observations which suffers from large periodic gaps and insufficient observations per firm.[16] Scholars such as Leary and Roberts (2010) questioned the practical interpretation of the strict pecking order. Our discovery indicates that the strict version of the pecking order theory does not apply to the Malaysian firms.

Under the semi-liberal specification, firms are smaller and less tangible compared to the liberal one. On average, they are less solvent, more leveraged and face a larger deficit (Tables III.5 and III.6). The number of firms with positive investment opportunities and insufficient funds beyond the maximum debt capacity is higher in the liberal case. In the next section, we detail the discussion of our results.

We perform a multinomial logistic regressions to estimate our model (Davidson et al., 1993; Greene, 2012). Logistic models are a popular approach to examine funding decisions in corporate finance literature as in Baskin (1989), Elliott et al. (2008), Denis and Mihov (2003) and Leary and Roberts (2010). We run an Independence of Irrelevance Assumption (IIA) test developed by Long and Freese (2006). It states that categories represented by a multinomial variable should be alternatives and not substitutes. The test shows that the six categories defined in the dependent variable are significantly distinguishable and will not be combined. This finding supports our argument of the importance of differentiating between sukuk types according to their structure. Firms' perception of such differences is one aspect we are examining in our research. Although the developers of the IIA test criticized its consistency, we run it for diagnostic purposes. Further, the Hausman test and seemingly unrelated estimation-based Hausman test show significant evidence that regressions outputs are independent of each other (Freese et al., 2000; Kleinbaum and Klein, 2010). We report that all explanatory variables significantly affect the funding choice at the 1% significance level. We use STATA to perform all estimations. STATA written commands allow for a cross-sectional panel logistic estimations (Long and Freese, 2006). We run all the models with standard errors clustered at the firm and sector levels.

[16] A total of 444 observations or 10% of the original sample.

Marginal effects better present multinomial logistic models (Cameron and Trivedi, 2010; Long, 2009). According to Williams (2012), using marginal effects makes categorical results interpretation more tangible. Therefore, we discuss our results subject to the average marginal effects of variables of interest relative to the choice of funding instrument in both versions of the pecking order.

I. Semi-Liberal Pecking Order

In this version of the pecking order, minimum savings and maximum debt capacity are matched to the industry averages. Thus, debt is adjusted to a target (industry average), which accords to the trade-off model assumptions.

We recall that α is firms' constrained deficit. In the first stage, the deficit is constrained by the minimum saving level $\alpha^{C(min)}$, and Malaysian firms are to raise external funds with sukuk, conventional bonds or bank loans. We find that the effect of the deficit on funding choice is significant but relatively small. On average, firms prefer to obtain funds from bank loans (P=4%) and PLS sukuk (P=1%) when deficit size is large. At lower deficit values, the probability of issuing zero-coupon sukuk is 2% (Table III.9 and Figure III.7).

In the second stage, the deficit is constrained by the maximum debt capacity $\alpha^{D(max)}$. Firms can issue sukuk or shares to acquire needed funds. The impact of the deficit is more pronounced than in the previous stage. Firms are more likely to issue fixed-income sukuk with 25% probability when deficit size is rather small (Table III.9 and Figure III.7).

Altering the constraint in each stage does affect the relationship between firm characteristics and the probability of using each funding source. Marginal effects are presented in Table III.12 and illustrated in Figures III.10, III.11 and III.12. In the first stage, as firms' size increase, firms prefer to issue fixed-income sukuk (P=1.3%), bonds (P=1%) and PLS (P=0.8%). Smaller firms, however, have a 2% probability of doing nothing. Tangibility refers to the concentration of fixed assets in a firm. Tangible firms are 3.2% more likely to issue conventional bonds, while it is not a significant factor in choosing sukuk or bank loans.

All firms in our sample have a book to market ratio that is equal to or greater than 1. That indicates that all firms are undervalued, including firms in the technology sector. Hence, their stocks are traded at prices lower than their actual worth. We find that growth opportunity significantly affects fixed-income and zero-coupon sukuk only. Firms with greater growth opportunity prefer to issue zero-coupon sukuk (P=2%). On the contrary, firms with lower growth opportunity or higher book to market ratio issue fixed-income sukuk (P=0.8%).

The sample firms appear to have weak credit positions as the Altman Z-scores reach a maximum of 1.5, which is below the minimum threshold of 1.8. However, firms in the upper percentile prefer to issue zero-coupon sukuk and conventional bonds with probabilities equal to 2.2% and 1.6% respectively. Leverage levels significantly and positively impact the issuance of zero-coupon sukuk (P=13%). Profitability does not have a significant impact on funding sources at this stage.

As we take into consideration the maximum debt capacity in addition to cash exhaustion, the size of the conditioned deficit affects the relationship between firm characteristics and the choice of capital funding change (Table III.12). At this stage, according to the pecking order theory, firms have exhausted both their savings and maximum debt capacity and seek other sources. In a conventional finance world, the only funding option would be issuing shares (Myers and Majluf, 1984). However, our findings show that the probability of issuing equity is 6% as firm size increases. That is followed by PLS sukuk with 3.2% probability. Smaller firms prefer to issue zero-coupon sukuk (P=2%). Tangibility positively and significantly affect the probability of issuing FIS (P=6.5%). Intangible firms prefer to issue zero-coupon (P=9%) and PLS sukuk (P=5.2%).

Similar to the first stage, firms with low growth outlook prefer to issue fixed-income sukuk (P=3.14%). While growing firms prefer to issue shares and zero-coupon sukuk (P=4.88% and P=3% respectively). Profitable firms are more likely to issue shares with 2% probability. Troubled firms prefer to issue zero-coupon and fixed-income sukuk (P=36% and 9.27% respectively). Solvent firms continue to prefer zero-coupon sukuk, while insolvent firms prefer to issue PLS sukuk. Unlike the first stage, leveraged firms prefer to issue PLS sukuk (P=5.5%). Figures III.13, III.14 and III.15 demonstrate the marginal effects of firm characteristics in this stage.

In summary, we observe that in a semi-liberal pecking order specification, the deficit size significantly explains the issuance of the different types of sukuk. We show that beyond the minimum savings thresholds, Malaysian firms prefer to raise funds via zero-coupon sukuk and PLS sukuk, whereas, the issuance of FIS is significant beyond firms' maximum debt capacity. The implications of firm characteristics are more pronounced than in the second stage of the specification; specifically, when comparing sukuk with equity rather than conventional bonds. We furnish more insights in the discussion section.

II. Liberal Pecking Order

In the liberal interpretation of the pecking order theory, firms' cash management and leverage policies are firm-determinant. Therefore, firms keep cash and debt equal to their average historical levels. The first constrained deficit (by $\alpha^{C(min)}$) significantly affects zero-coupon sukuk. When the deficit size is small, the probability of issuing zero-coupon sukuk is 14.1%. Beyond the second threshold ($\alpha^{D(max)}$) firms fund small financial deficiencies with zero-coupon sukuk (P=31.7%) and fixed-income sukuk (P=24.1%). Figure III.8 illustrates the marginal effects of each threshold with respect to funding instruments.

As in the previous case, the effect of firm characteristics on the probabilities of utilizing each funding source varies across thresholds, as shown in Table III.13. Beyond their minimum saving requirement thresholds, large firms are more likely to issue FIS, PLS sukuk and conventional bonds(P=1.35%, 1.32% and 0.88%). Small firms have a greater probability of issuing zero-coupon sukuk and bank loans. Tangibility does not have a significant impact on funding options.

Firms with future growth outlook issue bonds and zero-coupon sukuk (P=1.94% and 1.27% respectively). Firms with lower growth perspective (higher book to market ratio) are more

likely to issue FIS (P=0.7%). Troubled firms are more likely to issue PLS sukuk with 18.1% probability. Firms with better credit stability are more likely to issue PLS sukuk and bank loans (P=1.5% and 8.7% respectively). Leverage levels have a positive and significant effect on issuing conventional bonds (P=6.4%) and zero-coupon sukuk (P=5.2%). Low-leveraged firms prefer to raise funds through bank loans. Figures III.17, III.18 and III.19 demonstrate the marginal effects of firm characteristics of this stage.

The introduction of the second threshold ($\alpha^{D(max)}$) alters the role of firm characteristics in selecting the external funding source. Larger firms prefer to raise funds via PLS and FIS (P=1.34%, P=1.06%) and through issuing sharea with a greater probability (P=4.7%). Being intangible and profitable significantly impacts the probability of issuing equity (P=8% and P=9.4%). Fixed-income sukuk are more likely to be issued by firms with high book to market ratio (P=1.2%). Firms with future growth opportunity prefer to issue zero-coupon sukuk (P=1.9%).

Financially stable firms have a higher probability of issuing equity to raise funds. Conversely, insolvent firms prefer to use FIS (P=3.4%). The increase in leverage levels is associated with the probability of issuing ZC, FIS and PLS sukuk (P=35%, 17.4% and 9.7%). Figures III.20, III.21 and III.22 exhibit marginal effects of firm characteristics.

Our results from this specification give further evidence that the market recognizes the different sukuk structures. Also, sukuk types can be ranked according to a liberal pecking order interpretation. As we show above, the deficit size determines that beyond minimum savings, Malaysian firms prefer to issue zero-coupon sukuk. Firms issue fixed-income sukuk after exhausting their debt capacity. The effect of firm characteristics shows some degree of consistency with the semi-liberal pecking order case.

VIII. Discussion

As we discussed earlier, the literature provides two opinions about when firms choose to issue sukuk. On the one hand, sukuk involve less information asymmetry because of their unique structure. Therefore, firms should prefer sukuk over bonds (Abdul Halim et al., 2017; Ebrahim et al., 2014; Grassa and Miniaoui, 2017; Mohamed et al., 2014). On the other hand, Klein and Weill (2016) and Ebrahim et al. (2014) assert that the unique features of sukuk coupled with the conventional financial mainstream lead to inefficient enforcement of the certificates. This causes higher degrees of information asymmetry and justifies the preference of bonds over sukuk. Our results challenge both statements.

Our findings significantly underline the differences between sukuk types. Hence, our hypotheses that test issuing sukuk as a single instrument against bonds or equity are invalid. In both pecking order specifications, firms prefer to issue PLS sukuk when internal funds are exhausted and prefer to issue FIS beyond the maximum debt capacity. Therefore, it is critical to acknowledge the type of sukuk contract when analysing capital structure decisions. Particularly, when constrained by minimum savings, it is safe to say that to Malaysian firms, PLS sukuk involve less adverse selection problems compared to conventional bonds and FIS. This conclusion is partially in line

with the argument of Abdul Halim et al. (2017); Ebrahim et al. (2014); Mohamed et al. (2014) and Grassa and Miniaoui (2017).

Similarly, Malaysian firms' preference to obtain funds via FIS beyond the maximum debt capacity is a critical observation. First, it emphasizes Myers and Majluf's (1984) claim that equity is the most informationally expensive funding tool. Second, it indicates that a specific type of sukuk is preferred over equity. Third, it provides additional evidence that Malaysian firms perceive the difference between sukuk types. Fourth, it - to some degree - confirms Klein and Weill's (2016) argument of why sukuk are the choice of firms with high information asymmetry.

In short, when internal funds are fully consumed, firms in a dual financial system raise funds via PLS sukuk first, then choose conventional bonds, thus rejecting our first and second hypothesis stating that firms prefer sukuk and PLS instead of bonds when information asymmetry is high. Depleting the borrowing limit drives firms to issue FIS followed by issuing equity. That also leads to rejecting our hypothesis denoting that firms prefer sukuk and PLS sukuk over equity.

The discussion highlights that categorization of sukuk based on debt-equity characteristics is theoretically accurate. However, the market perceives otherwise. According to our results, the debt-like sukuk (FIS) is comparable to shares, while the equity-like sukuk (PLS) is comparable to debt. The latter is conceivably due to the contractual requirements of issuing sukuk and the mandatory establishment of the SPV, which reduces adverse selection. On the other hand, FIS contracts are based on leasing and cost-plus sale transactions with pre-determined periodic payments. Such sukuk are usually non-tradeable, inducing higher adverse selection.

The characteristics of zero-coupon sukuk are not clear because they are issued under both thresholds. However, the positive relationship between deficit and the issuance of debt is in line with Shyam-Sunder and Myers's (1999) and Helwege and Liang's (1996) findings, which acknowledge the debt characteristics of zero-coupon sukuk. Consistent with Chen (2004), Malaysian firms use bank loans before selecting sukuk as predicted for bank-based economies. The previous is with respect to deficit size, which is the key variable in our model.

Trying to depict capital structure preferences by only analysing firm characteristics results in mixed evidence, as in Abdul Halim et al. (2017); Mohamed et al. (2014); Nagano (2016) and Grassa and Miniaoui (2017). We find that sukuk debt-equity features are not clear because sukuk are issued in conjunction with shares and conventional bonds. However, results confirm that to Malaysian firms' sukuk encompass less information asymmetry compared to conventional bonds, but more than bank loans. Equity is the most expensive funding tool, consistent with the Myers and Majluf (1984) pecking order. Issuing equity has the least issuance probability.

In particular, we find that large firms issue PLS sukuk, FIS and bonds with comparable magnitudes, which is in line with the trade-off model, whereas small firms prefer to issue funds via zero-coupon sukuk. These findings refute Klein and Weill's (2016) argument; that small firms issue sukuk because large firms are solidly established and can effortlessly tap the bond market.

Klein and Weill (2016) state that sukuk issuers are those with greater market to book ratios. Nevertheless, we find firms with growth potential issue fixed-income sukuk, while firms with

a high market to book ratio prefer zero-coupon sukuk. That is another confirmation of the different debt-equity characteristics of sukuk.

The impact of tangibility and profitability is significant beyond the maximum debt threshold in the comparison between equity and sukuk. Despite the role of tangible assets in sukuk structures, we find that intangible firms prefer to obtain funds via PLS and ZC sukuk. Klein and Weill (2016) explain that less collateralized firms resort to sukuk because they are risky. As proposed by the literature, we find non-profitable firms select FIS and zero-coupon sukuk, while profitable firms go for shares. Issuing sukuk allow firms to transfer unprofitable projects outside the balance sheet to the sukuk-holders.

For further insight, in Table III.16 we compare the expected signs of the association between firm characteristics and the issuance of sukuk, equity and bonds according to the pecking order theory. The combination of trade-off and pecking order theories affirms sukuk characteristics as the predicted signs show.

Our analysis adds depth to the Islamic corporate finance literature. It takes into account the types of sukuk, and employs higher data frequency to make the most of the data. We apply a theory-based model that produces consistent findings. Among others, Leary and Roberts (2010) and Graham and Leary (2011) assert that trade-off and pecking order theories are complementary in explaining corporate capital structure rather than two stand-alone views.

I. Modified Pecking Order in Emerging Markets

Scholars such as Demirgüç-Kunt and Maksimovic (1999), Booth et al. (2001); De Jong et al. (2008) and Fan et al. (2012) suggest that firms in emerging markets maintain a modified pecking order of funding sources where issuing equity is favoured over bonds. We use their argument to examine corporate funding decisions further, adding sukuk as an option. We allow bonds and equity to be possible funding choices for firms in both stages of the pecking order. Therefore, we estimate firm capital decisions using Equations IV.1 and IV.2 given the following funding alternatives:

$$Extfunds_{it} = \begin{cases} 1 & \text{Conventional Bonds} \\ 2 & \text{PLS Sukuk} \\ 3 & \text{FI Sukuk} \\ 4 & \text{ZC Sukuk} \\ 5 & \text{Equity} \\ 6 & \text{Bank Loan} \\ 7 & \text{Do Nothing} \end{cases} \tag{III.9}$$

We present our findings in Tables III.17 and III.18. Marginal effects confirm our main results. Firms prefer FIS over shares when the debt capacity reaches its maximum. The probability of issuing sukuk is 15% and 10.6% in both specifications, while issuing shares is insignificant. Zero-coupon sukuk remain an option regardless of the threshold. Additionally, at this stage, the probability of writing conventional bonds is significant, with approximately 5% probability. On the contrary, firms are more likely to borrow through issuing shares (P=15%) when firms approach their minimum cash thresholds. The behavior of firms toward bonds and shares is in line with the findings of Demirgüç-Kunt and Maksimovic (1999),Booth et al. (2001), De Jong et al. (2008) and Fan et al. (2012).

II. Debt-Equity Characteristics of Sukuk

Sukuk are not an innovation (Wilson, 2008). One can identify grey areas between structures of sukuk, bonds and shares. However, that does not impact the fact that such instruments are compliant with the Islamic guidelines and serve purposes other than profit maximization. Scholars find the resemblance between the instruments convenient grounds to classify sukuk. We shall reiterate that fixed-income and zero-coupon sukuk are considered debt-like, while PLS sukuk are deemed to have more equity characteristics.

We use this classification to examine the probability of issuing sukuk among conventional instruments. We assume that debt-like sukuk, along with conventional bonds, are used when firms exhaust their internal funds. PLS sukuk and shares the least preferred according to the pecking order, beyond maximum debt. Therefore, external funding alternatives are defined as follows:

Stage 1: Deficit constrained by $\alpha^{C(min)}$

$$Extfunds_{it} = \begin{cases} 1 & \text{Conventional Bonds} \\ 2 & \text{PLS Sukuk} \\ 3 & \text{FI Sukuk} \\ 4 & \text{ZC Sukuk} \\ 5 & \text{Bank Loan} \\ 7 & \text{Do Nothing} \end{cases}$$

Stage 2: Deficit constrained by $\alpha^{D(max)}$

$$Extfunds_{it} = \begin{cases} 1 & \text{PLS Sukuk} \\ 2 & \text{Equity} \\ 3 & \text{Do Nothing} \end{cases}$$

With respect to the above, we re-estimate Equations IV.1 and IV.2. We find that in the semi-liberal specification, none of the Islamic certificates are significant. Thus, the alternatives do not match the thresholds. For instance, being not able to select PLS sukuk in the first stage makes other choices inferior. The same applies to issuing FIS in the second stage. However, in the liberal specification, where we relax the deficit constraints, firms amend funding preferences. In particular, rather than issuing PLS sukuk, firms go for FIS in the first stage. Nonetheless, Malaysian corporations prefer sukuk over bonds. Tables III.19 and III.20 present our results.

III. Sharia-Compliance and Conventional Debt Levels

In order to be listed as firms that adopt Islamic finance principles, "Sharia-compliant" firms must adhere to all Islamic finance restrictions and prohibitions. However, given that formal Islamic finance practices are recent, scholars and practitioners established thresholds to govern Sharia-compliance. For instance, an Islamic firm can utilize conventional debt under the condition that conventional debt levels do not exceed 5% of total debt in the Kuala Lumpur Stock exchange, while it can go up to 33% as per the general Islamic principles. Building on the above, in this section, we assume that if Malaysian firms aim to maintain a "Sharia-compliant" status, the probability of issuing conventional bonds is positive if firms' leverage ratio is below 5%. Likewise, the probability of issuing sukuk increases if firms' leverage ratio exceeds 5%, because issuing bonds is no longer an option. We also extend our analysis to the 33% debt ratio threshold.

We re-estimate equation IV.1 in liberal and semi-liberal pecking order specifications. Our results show that as the constrained deficit increase in the semi-liberal pecking order with firms with book leverage less than or equal to 5% firms prefer to either approach banks to obtain funding or do nothing. Beyond the 5% sharia compliance threshold, first prefer to issue zero-coupon sukuk and fixed income sukuk if we ignore the significance level. In the liberal specification, firms with book leverage less than or equal to 5% prefer to use FIS. Nothing changes for those above 5%. Firms prefer to issue zero-coupon sukuk when leverage levels are greater than 5%. The findings suggest that in Malaysia firms' preference to issue sukuk is not driven by the desire to maintain a "Sharia-compliant" status. That, support our approach of using a modified version of the pecking order taking into account a constrained deficit and firm characteristics.

When using a more general conventional debt leverage, our findings show that the deficit levels are positively and significantly associated with the probability of issuing bonds when firms' book leverage is less than 33% in both pecking order specifications. Where leverage ratio is greater than 33%, Malaysian firms are more likely to issue FIS in the semi-liberal specification compared to PLS and zero-coupon sukuk in the liberal case (Figure III.24). Accordingly, a more rigorous debt threshold achieve the "Sharia-compliant" status. We do not refer to bank loans at this stage because it is not possible to differentiate between Islamic and conventional bank loans.

IX. Conclusion

In this paper, we have managed to position the different types of sukuk in Malaysian firms' financial hierarchy. Our data show that in dual financial system economies, Islamic and conventional capital market instruments are not mutually exclusive. At least 112 Malaysian firms issued sukuk, equity and bonds simultaneously in the period 2005–2017. Therefore, the religious motive to utilize sukuk is void because it would result in a sukuk-only capital structure. This paper attempts to explain Malaysian firms' capital decisions in light of conventional capital structure theory.

We use a theoretical framework where we first define two points in the pecking order hierarchy, which are the exhaustion of internal funds and maximum debt capacity. Then, from a basket of funding instruments, including bonds, equity, and sukuk, we look at the firms' funding choices at each of the defined points. The choice indicates the perceived adverse selection and information asymmetry involved in each instrument. We use quarterly financial and accounting data of 112 Malaysian firms from the period between 2005 and 2017.

Our findings show that Malaysian firms recognize different levels of information asymmetry not only in conventional bonds and equity but also between the different classifications of sukuk. Our results highlight that in a modified pecking order, sukuk are preferred to bonds when internal funds are fully utilized. Also, beyond maximum debt capacity, firms prefer to issue sukuk over equity. However, zero-coupon sukuk are the last funding option in both thresholds. Also, we highlight that according to Malaysian firms' funding choices; debt-like or fixed-income sukuk are comparable to shares, while profit-loss sharing sukuk have more in common with debt. Finally,

the classical distinction between sukuk in aggregate and conventional bonds –and ignoring equity features– proved to be not entirely accurate.

The Islamic finance guidelines call for financing based on ethical values that can produce a moral economic system. Its goal is to achieve socio-economic equality and to give a cause to businesses other than profit maximization. Countries such as Malaysia attempted to utilize the Islamic values and investments, not only to attract Muslim investors but also to create diversification. Malaysia provided several tax incentives to encourage issuing and investing in sukuk. Malaysian tax law treated Islamic and conventional transactions equally. For example, to avoid over-taxation, Islamic profits are assimilated to traditional interest, and profits from sukuk are tax exempted. Also, Islamic partnerships that are similar to venture capital are not considered partnerships from a tax perspective. The previous is a logical motive for issuers to prefer sukuk over conventional bonds and equity regardless of faith.

It is vital to match the theoretical merits of Islamic finance guidelines to the actual implementation of its values and instruments. Sukuk have distinct legal, financial and regulatory requirements, which necessitate an adequate understanding of its principles, application and possible conventions. Countries such as Hong Kong, Tunisia and Kazakhstan are undertaking regulatory and legal reforms to accommodate Islamic banking and finance. Additionally, recognizing the accessibility of other funding tools stimulates diversification opportunities with ethical potential, beyond the religious restriction.

Our results indicate that the utilization of the different types of sukuk emphasizes the need for various forms of regulations and supervision. According to El Qorchi (2005), formal regulations should be extended beyond banks to capital markets and other sectors. It also shows that there is a need for redefining Islamic capital, debt and equity and to restructure the regulatory framework to incorporate the unique structure of Islamic investment securities.

The ability to rank sukuk in a corporate financial hierarchy among traditional instruments improves the understanding of its structure and reduces ambiguity to the international economy. That, in turn, enhances Islamic finance reachability and globalization by reaching out to international investors and issuers and situating sukuk in a familiar context, beyond religion. It also assists investors and the market to read the signals when firms choose to raise funds via a specific sukuk contract in a dual financial system economy. Finally, empirically verifying sukuk characteristics improves its valuation and pricing mechanisms, risk evaluation and credit rating.

X. Appendix

I. Tables

Table III.1.: Frequency of external funding sources

	Frequency	Percent	Description
Islamic Investment Certificates			
Zero-coupon Sukuk	85	7.09	
Fixed Income Sukuk	181	6.93	Ijarah, Istitna, Murabaha, and Wakalah Sukuk
Profit-loss sharing Sukuk	65	2.49	Mudharabah and Musharakah
Conventional Instruments			
Bank Loan	1319	50.54	5% increase in long term debt Leary and Roberts (2010)
Equity	721	27.62	New shares offered
Bonds	139	5.33	New bond issuances
Total	5066	100.00	

The table presents the issuance frequencies of sukuk, and traditional funding instruments; bonds, equity and bank loans over the period 2005-2017. Each issuance takes place in a specific quarter by a certain firm. In case of multiple issuance per quarter, issuances are summed if the same instrument is used. The last column detail issuance contract types. Fixed income sukuk are Islamic securities with more debt characteristics. PLS possess more equity features. Zero-coupon sukuk is a special type of fixed income sukuk which present pure debt. Sukuk and bonds data are obtained from Bloomberg. New equity issuances and bank credit lines are obtained from Compustat.

Table III.2.: Sectors summary

Sector	GIC Sector code	No. of firms	Obsv.	PLS	FIS	ZCS	Sukuk (total)	Bonds	Shares	Bank loans
Industrial	20	34	1474	28	56	30	114	56	240	307
Real Estate	60	15	713	17	23	12	52	11	111	153
Consumer Discretionary	25	14	641	10	14	41	65	8	33	145
Energy	10	12	568	1	10	32	43	21	44	158
Materials	15	11	495	3	12	38	53	4	31	97
Consumer Staples	30	9	360	1	17	18	36	16	51	88
Utilities	50	7	331	3	14	1	18	14	76	50
Telecommunications	55	5	243	2	27	0	29	8	62	54
Healthcare	35	9	143	0	8	1	9	1	68	44
Technology	45	2	97	0	0	12	12	0	5	19
Total		118	5065	65	181	185	431	139	721	1115

This table presents the distribution of Malaysian firms over sectors. It shows the issuance frequencies of sukuk, and traditional funding instruments; bonds, equity and bank loans over the period 2005-2017 per sector. In case of multiple issuance per quarter, issuances are summed if the same instrument is used. Sukuk and bonds data are obtained from Bloomberg. New equity issuances and bank credit lines are obtained from Compustat. A 5% increase in long term debt is considered a new bank loan.

Table III.3.: Variable Definitions

Variable	Measure
1. Dependent Variable	
(A) Stage 1	
$Extfunds_{it}$	A dummy variable representing firms' funding sources for each firm i in quarter i. , It takes variables from 1-7 where: 1 = conventional bonds, 2= profit-loss sharing sukuk(PLS), 3= fixed income sukuk (FIS), 4= zero-coupon sukuk (ZCS), 5= bank loans, 6= do nothing
(B) Stage 2	
$Extfunds_{it}$	A dummy variable representing firms' funding sources for each firm i in quarter i. , It takes variables from 1-5 where: 1 = shares, 2= profit-loss sharing sukuk(PLS), 3= fixed income sukuk (FIS), 4= zero-coupon sukuk (ZCS), 5= do nothing
2. Independent Variable	
(A) Variable of interest	
$\alpha_{it}^{C(min)}$	The lower bound of savings. It is defined in each pecking order case as follows: Case 1: $\alpha_{it}^{C(min)} = 0$ Case 2: $\alpha_{it}^{C(min)}$ = current cash balance + median of cash balance of firms in the same industry-year combination Case 3: $\alpha_{it}^{C(min)}$ = current cash balance + median of historical cash balance of the same firm
$\alpha_{it}^{D(max)}$	The upper bound of maximum debt capacity. It is defined in each pecking order case as follows: Case 1: $\alpha_{it}^{D(max)} = 1$ Case 2: $\alpha_{it}^{D(max)}$ = debt capacity is equal to the debt ratio of the industry's investment grade companies. Case 3: $\alpha_{it}^{D(max)}$ = debt capacity can vary according to the firm's needs. Calculated as the annual average debt ratio of the firm.
(B) Firm-specific characteristics	
$\sum_{k=1} X_{it}$	
Firm Size	Natural log of Total Assets
Tangibility	Total Fixed Assets/Total Assets
Book Leverage	(Debt in Current Liabilities + Long-term Debt)/Total Assets
Profitability	Total Assets/Net Income
Credit Strength	Altman Z-score = $\frac{ROA+(\frac{Equity}{Assets})}{\sigma ROA}$
Growth Opportunity	[Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets
Liquidity	Total Current Assets/Total Current Liabilities
Economic Condition	GDP growth
Sector	GIC Sectors

This table presents variables definitions. Dependent variables and deficit constraints ($\alpha_{it}^{C(min)}$ and $\alpha_{it}^{D(max)}$) are defined for each pecking order case in each stage. Definitions of firm characteristics used as control variables according to Dahiya et al. (2017); Frank and Goyal (2009).

Table III.4.: Descriptive statistics for firm characteristics

Variable		Mean	Std. Dev.	Min	Max	Observations
Size	overall	6.3347	1.5127	1.5490	10.4446	N = 4815
	between		1.4604	2.8541	10.1015	n = 108
	within		0.4874	3.8083	8.3940	T-bar= 44.5833
Tangibility	overall	0.2810	0.2303	0.0000	0.9367	N = 4815
	between		0.2112	0.0000	0.7854	n = 108
	within		0.0971	-0.1826	0.7934	T-bar= 44.5833
Growth Opportunity	overall	1.2625	1.1983	0.1020	13.2945	N = 4815
	between		1.0112	0.2217	7.4355	n = 108
	within		0.5828	-3.9296	7.6970	T-bar= 44.5833
Profitability	overall	0.0159	0.0327	-0.7557	0.6869	N = 4686
	between		0.0161	-0.0390	0.1001	n = 108
	within		0.0291	-0.7131	0.6864	T-bar= 43.3889
Solvency	overall	0.5363	0.7904	-30.6262	2.0820	N = 4815
	between		0.4572	-1.5659	1.5888	n = 108
	within		0.6460	-28.5240	3.0290	T-bar= 44.5833
Leverage	overall	0.2786	0.1759	0.0000	1.8258	N = 4815
	between		0.1459	0.0187	0.7785	n = 108
	within		0.1066	-0.2497	1.6635	T-bar = 44.5833
GDP Growth	overall	0.3843	7.3819	-48.5751	27.1032	N = 4986
	between		0.6352	-3.1804	1.6635	n = 111
	within		7.3679	-48.6630	26.4003	T-bar = 44.9189

Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. We generated quarterly financial information of 108 Malaysian firms from Compustat. Table III.3 presents variables definitions.

Table III.5.: Descriptive statistics of firms in the semi-liberal pecking order specification

Semi-liberal Pecking order												
Variable		Mean	Std. Dev.	Min	Max	Observations	Variable		Mean	Std. Dev.	Min	Max	Observations
$\alpha^{C(min)}$	overall	-0.3568	0.8763	-9.6716	-0.0003	N = 3377	$\alpha^{D(max)}$	overall	-0.5639	0.9493	-20.3795	-0.0002	N = 4383
	between		0.6344	-5.6358	-0.0161	n = 106		between		0.6774	-5.8382	-0.0525	n = 108
	within		0.4255	-4.3925	3.0550	bar = 31.8585		within		0.6148	-18.7014	3.4202	bar = 40.5833
Size	overall	5.9582	1.3450	1.5490	9.6885	N = 3377	Size	overall	6.3716	1.5099	1.5490	10.4446	N = 2367
	between		1.3984	2.8527	9.5018	n = 106		between		1.4514	3.6069	10.3209	n = 102
	within		0.4676	3.4398	8.1211	T-bar = 31.8585		within		0.4160	3.8606	8.3876	T-bar = 23.2059
Tangibility	overall	0.2567	0.2185	0.0000	0.9367	N = 3377	Tangibility	overall	0.2963	0.2391	0.0000	0.9115	N = 2367
	between		0.2026	0.0000	0.6862	n = 106		between		0.2237	0.0000	0.7941	n = 102
	within		0.0934	-0.1657	0.7683	T-bar = 31.8585		within		0.0913	-0.1767	0.6490	T-bar = 23.2059
Growth Opp.	overall	1.3123	1.3096	0.1255	13.2945	N = 3377	Growth Opp.	overall	1.1873	0.9370	0.1700	10.5061	N = 2367
	between		1.0883	0.2243	7.4522	n = 106		between		1.0852	0.2175	7.3415	n = 102
	within		0.5964	-4.8327	7.1928	T-bar= 31.8585		within		0.3693	-2.1165	4.5709	T-bar = 23.2059
Profitability	overall	0.0150	0.0367	-0.7557	0.6869	N = 3366	Profitability	overall	0.0122	0.0374	-0.7557	0.6869	N = 2356
	between		0.0184	-0.0562	0.1056	n = 106		between		0.0174	-0.0429	0.0932	n = 99
	within		0.0327	-0.7127	0.6866	T-bar = 31.7547		within		0.0348	-0.7140	0.6833	T-bar = 23.798
Solvency	overall	0.5277	0.9123	-30.6262	2.0820	N = 3377	Solvency	overall	0.4086	0.9553	-30.6262	1.8428	N = 2367
	between		0.4854	-1.6752	1.6139	n = 106		between		0.4901	-1.9895	1.3769	n = 102
	within		0.7544	-28.4234	3.1296	T-bar= 31.8585		within		0.8458	-28.4692	3.0838	T-bar = 23.2059
Leverage	overall	0.2792	0.1798	0.0000	1.8258	N = 3377	Leverage	overall	0.3908	0.1493	0.0000	1.8258	N = 2367
	between		0.1533	0.0128	0.8442	n = 106		between		0.1312	0.0000	0.7998	n = 102
	within		0.1106	-0.2476	1.6554	T-bar = 31.8585		within		0.0896	-0.1768	1.7628	T-bar = 23.2059
GDP Growth	overall	1.2792	3.6807	-48.5751	6.0221	N = 3377	GDP Growth	overall	1.3384	3.2271	-7.8733	6.0221	N = 2367
	between		0.6690	-1.5363	3.5314	n = 106		between		0.8532	-4.8406	3.2190	n = 102
	within		3.6418	-46.6425	8.8376	T-bar = 31.8585		within		3.2055	-8.1447	7.1833	T-bar = 23.2059

This table presents descriptive statistics for firms in the semi-liberal pecking order specification. In this pecking order version, deficit is constrained by firms savings and leverage levels are held at the industry averages. In the first panel we show firm characteristics when internal funds are exhausted and firms can choose between bonds and sukuk to obtain funds externally. The second panel shows firm characteristics when deficit is constrained by maximum debt capacity, and firms can raise funds by issuing sukuk or equity. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. We generated quarterly financial information of 108 Malaysian firms from Compustat.

Table III.6.: Descriptive statistics of firms in the liberal pecking order specification

Liberal Pecking order													
Variable		Mean	Std. Dev.	Min	Max	Observations	Variable		Mean	Std. Dev.	Min	Max	Observations
$\alpha^{C(min)}$	overall	-0.1274	0.1222	-1.0330	-5.22E-06	N = 3516	$\alpha^{D(max)}$	overall	-0.3792	0.2639	-7.2945	-0.0023	N = 4416
	between		0.0832	-0.7131	-0.0216	n = 108		between		0.167	-1.0376	-0.0690	n = 108
	within		0.0878	-0.7611	0.5776	bar = 32.5556		within		0.2142	-6.8044	0.2639	bar = 40.8889
Size	overall	6.4114	1.4982	1.7410	10.4446	N = 3516	Size	overall	6.3679	1.5236	1.5490	10.4446	N = 4416
	between		1.4584	2.8527	10.2986	n = 108		between		1.4656	2.8527	10.1168	n = 108
	within		0.4550	3.9671	8.4590	T-bar = 32.5556		within		0.4606	3.8569	8.4343	T-bar = 40.8889
Tangibility	overall	0.2617	0.2193	0.0000	0.9367	N = 3516	Tangibility	overall	0.2814	0.2298	0.0000	0.9367	N = 4416
	between		0.2068	0.0000	0.7407	n = 108		between		0.2119	0.0000	0.7825	n = 108
	within		0.0903	-0.1874	0.7460	T-bar = 32.5556		within		0.0954	-0.2045	0.8031	T-bar = 40.8889
Growth Opportunity	overall	1.2727	1.1556	0.1128	13.2945	N = 3516	Growth Opportunity	overall	1.2667	1.2047	0.1128	13.2945	N = 4416
	between		0.9940	0.2190	7.4141	n = 108		between		1.0215	0.2190	7.4141	n = 108
	within		0.5180	-3.2854	8.3002	T-bar = 32.5556		within		0.5664	-4.0835	7.5431	T-bar = 40.8889
Profitability	overall	0.0151	0.0298	-0.3764	0.6869	N = 3505	Profitability	overall	0.0153	0.0330	-0.7557	0.6869	N = 4405
	between		0.0168	-0.0518	0.0844	n = 108		between		0.0166	-0.0429	0.0997	n = 108
	within		0.0265	-0.3642	0.6829	T-bar = 32.4537		within		0.0293	-0.7109	0.6864	bar = 40.787
Solvency	overall	0.5596	0.6282	-15.2623	2.0820	N = 3516	Solvency	overall	0.5381	0.8111	-30.6262	2.0820	N = 4416
	between		0.4392	-0.8384	1.6147	n = 108		between		0.4707	-1.7484	1.6147	n = 108
	within		0.4337	-14.2406	2.4895	T-bar = 32.5556		within		0.6626	-28.3397	3.2133	T-bar = 40.8889
Leverage	overall	0.2745	0.1779	0.0000	1.8258	N = 3516	Leverage	overall	0.2836	0.1755	0.0000	1.8258	N = 4416
	between		0.1524	0.0061	0.8272	n = 108		between		0.1484	0.0224	0.7998	n = 108
	within		0.1010	-0.2710	1.7033	T-bar = 32.5556		within		0.1035	-0.2839	1.6557	T-bar = 40.8889
GDP Growth	overall	1.2715	3.7090	-48.5751	6.0221	N = 3516	GDP Growth	overall	1.2688	3.6343	-48.5751	6.0221	N = 4416
	between		0.5761	-1.7785	2.7602	n = 108		between		0.2961	-0.2721	1.8845	n = 108
	within		3.6797	-47.5494	7.8344	T-bar = 32.5556		within		3.6238	-47.5521	7.1148	T-bar = 40.8889

This table presents descriptive statistics for firms in the liberal pecking order specification. In this pecking order version, saving and leverage levels are determined by firms individually . In the first panel we show firm characteristics when internal funds are exhausted and firms can choose between bonds and sukuk to obtain funds externally. The second panel shows firm characteristics when deficit is constrained by maximum debt capacity, and firms can raise funds by issuing sukuk or equity. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. We generated quarterly financial information of 108 Malaysian firms from Compustat.

Table III.7.: Correlation matrix

	Semi-liberal $\alpha^{C(min)}$	Semi-liberal$\alpha^{D(max)}$	Liberal $\alpha^{C(min)}$	Liberal $\alpha^{D(max)}$	Sector	L.Size	L.Tangibility	L.Growth Opp.	L.Profit.	L.Solvency	L.Leverage	GDP Growth
Semi-liberal $\alpha^{C(min)}$	1											
Semi-liberal $\alpha^{D(max)}$		1										
Liberal $\alpha^{C(min)}$			1									
Liberal $\alpha^{D(max)}$				1								
Sector	0.0388	0.048	0.0816	0.0761	1							
Size	0.4236	0.3671	0.058	-0.0046	0.053	1						
Tangibility	0.0218	0.0085	0.1021	0.0164	-0.3187	0.2173	1					
Growth Opp.	-0.0273	-0.0353	-0.0224	-0.0155	-0.0209	0.019	0.0923	1				
Profitability	0.1296	0.2404	0.0794	0.2544	0.0609	0.0849	0.0121	0.2247	1			
Solvency	0.1752	0.4462	-0.0461	0.3254	-0.1034	0.0183	-0.0066	0.0099	0.5172	1		
Leverage	0.0673	-0.1829	0.1188	-0.4958	-0.0599	0.0792	0.0932	-0.0228	-0.2044	-0.3879	1	
GDP Growth	0.0017	0.0069	0.012	0.0222	0.0115	0.0048	-0.0032	0.0075	0.0378	0.0067	0.0089	1

This table shows the correlation between firm characteristics and constrained deficit of each stage of the two versions of the pecking order. Variables definitions are presented in table III.3. Semi-liberal $\alpha^{C(min)}$= current cash balance + median of cash balance of firms in the same industry-year combination, Semi-liberal $\alpha^{D(max)}$ = debt capacity is equal to the debt ratio of the industry's investment grade companies, Liberal $\alpha^{C(min)}$ = current cash balance + median of historical cash balance of the same firm, and Liberal $\alpha^{D(max)}$ = the annual average debt ratio of the firm. Sector is a dummy variables taking values from 1 to 10 representing GIC sectors. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Table III.3 presents variables definitions.

Table III.8.: Marginal effects of constrained deficit (semi-liberal specification - stage 1)

	(1)			(2)			
	$\alpha^{C(min)}$			$\alpha^{C(min)}$+ Firm Characteristics			
Instrument	Pooled M.logit	S.E cluster-firm	S.E cluster-sector	Pooled	S.E cluster-firm	S.E cluster-firm/ sector charact.	S.E cluster-sector
Bonds	0.0148	0.0148	0.0148	0.00760	-0.000924	0.00760	0.00760
	(0.00936)	(0.0239)	(0.0114)	(0.0104)	(0.0130)	(0.0102)	(0.0162)
FIS	0.00937	0.00937	0.00937	0.00196	-0.00101	0.00196	0.00196
	(0.00747)	(0.0186)	(0.0113)	(0.00741)	(0.00983)	(0.0121)	(0.00874)
PLS	0.00708	0.00708	0.00708	-0.00563	-0.00662*	-0.00563*	-0.00563
	(0.00667)	(0.0101)	(0.0167)	(0.00389)	(0.00352)	(0.00337)	(0.00457)
ZCS	0.0295**	0.0295	0.0295	0.0284	0.0556**	0.0284*	0.0284
	(0.0131)	(0.0187)	(0.0203)	(0.0198)	(0.0259)	(0.0168)	(0.0282)
Bank Loans	-0.0224**	-0.0224	-0.0224	-0.0436***	-0.0394**	-0.0436***	-0.0436***
	(0.00983)	(0.0203)	(0.0156)	(0.0137)	(0.0180)	(0.0132)	(0.0133)
Do Nothing	-0.0384***	-0.0384	-0.0384	0.0112	-0.00767	0.0112	0.0112
	(0.0145)	(0.0371)	(0.0259)	(0.0190)	(0.0312)	(0.0188)	(0.0329)
Observations	2,763	2,763	2,763	2,759	2,759	2,759	2,759

This table reports the impact of constrained deficit ($\alpha^{C(min)}$) on the probability of issuing each external funding source. It reports marginal effects of the minimum cash holding condition under semi-liberal pecking order. In this stage, firms hold savings equal to the industry average. Probabilities are obtained from estimating Equation (IV.1). Variables definitions are shown in table III.3. Funding tools are: bonds, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), bank loans, and doing nothing. In (1) constrained deficit is the only explanatory variable. In (2) we add firm characteristics as explanatory variables. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.9.: Marginal effects of constrained deficit (semi-liberal specification - stage 2)

	(1)			(2)			
	$\alpha^{D(max)}$			$\alpha^{D(max)}$+ Firm Characteristics			
Instrument	Pooled M.logit	S.E cluster-firm	S.E cluster-sector	Pooled	S.E cluster-firm	S.E cluster-firm/ sector charact.	S.E cluster-sector
Equity	0.251***	0.251	0.251*	-0.0387	-0.0387	-0.0387	-0.0387
	(0.0422)	(0.174)	(0.136)	(0.0477)	(0.126)	(0.0652)	(0.0757)
FIS	0.121***	0.121*	0.121***	0.252***	0.252**	0.252***	0.252***
	(0.0314)	(0.0624)	(0.0412)	(0.0585)	(0.125)	(0.0877)	(0.0838)
PLS	0.0257	0.0257	0.0257	-0.0175**	-0.0175	-0.0175	-0.0175
	(0.0162)	(0.0391)	(0.0423)	(0.00840)	(0.0133)	(0.0112)	(0.0157)
ZCS	0.0101	0.0101	0.0101	0.0360	0.0360	0.0360	0.0360
	(0.0189)	(0.0344)	(0.0231)	(0.0284)	(0.0399)	(0.0284)	(0.0564)
Do Nothing	-0.408***	-0.408***	-0.408***	-0.232***	-0.232*	-0.232***	-0.232*
	(0.0416)	(0.153)	(0.121)	(0.0534)	(0.123)	(0.0718)	(0.138)
Observations	1,520	1,520	1,520	1,517	1,517	1,517	1,517

This table reports the impact of constrained deficit ($\alpha^{D(max)}$) on the probability of issuing each external funding source. It reports marginal effects of the maximum debt capacity condition under semi-liberal pecking order. In this stage, firm maintain debt ratio equal to the industry average. Probabilities are obtained from estimating Equation (IV.2).Variables definitions are shown in table III.3. Funding tools are: equity, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), and doing nothing. In (1) constrained deficit is the only explanatory variable. In (2) we add firm characteristics as explanatory variables. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.10.: Marginal effects of constrained deficit (liberal specification - stage 1)

	(1)			(2)			
	$\alpha^{C(min)}$			$\alpha^{C(min)}$+ Firm Characteristics			
VARIABLES	Pooled M.logit	S.E cluster-firm	S.E cluster-sector	Pooled	S.E cluster-firm	S.E cluster-firm/ sector charact.	S.E cluster-sector
Bonds	-0.00596	-0.00596	-0.00596	0.0274	0.0274	0.0274	0.0274
	(0.0339)	(0.0603)	(0.0821)	(0.0394)	(0.0527)	(0.0306)	(0.0552)
FIS	0.0691	0.0691	0.0691	0.0494	0.0494	0.0494	0.0494
	(0.0458)	(0.0586)	(0.0547)	(0.0497)	(0.0644)	(0.0528)	(0.0470)
PLS	-0.00157	-0.00157	-0.00157	-0.0119	-0.0119	-0.0119	-0.0119
	(0.0241)	(0.0319)	(0.0426)	(0.0279)	(0.0430)	(0.0248)	(0.0526)
ZCS	0.176***	0.176**	0.176***	0.141***	0.141**	0.141***	0.141***
	(0.0538)	(0.0724)	(0.0510)	(0.0493)	(0.0613)	(0.0441)	(0.0436)
Bank Loans	-0.359***	-0.359***	-0.359***	-0.494***	-0.494***	-0.494***	-0.494***
	(0.0793)	(0.120)	(0.0668)	(0.0879)	(0.141)	(0.0884)	(0.105)
Do Nothing	0.121	0.121	0.121	0.288***	0.288*	0.288***	0.288*
	(0.0953)	(0.163)	(0.0974)	(0.102)	(0.172)	(0.101)	(0.154)
Observations	2,814	2,814	2,814	2,808	2,808	2,808	2,808

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This table reports the impact of constrained deficit ($\alpha^{C(min)}$) on the probability of issuing each external funding source. It reports marginal effects of the minimum cash holding condition under liberal pecking order. In this stage, firms hold savings equal to the firms' historical averages. Probabilities are obtained from estimating Equation (IV.1). Variables definitions are shown in table III.3. Funding tools are: bonds, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), bank loans, and doing nothing. In (1) constrained deficit is the only explanatory variable. In (2) we add firm characteristics as explanatory variables. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.11.: Marginal effects of constrained deficit (liberal specification - stage 2)

	(1)			(2)			
	$\alpha^{D(max)}$			$\alpha^{D(max)}$+ Firm Characteristics			
VARIABLES	Pooled M.logit	S.E cluster-firm	S.E cluster-sector	Pooled	S.E cluster-firm	S.E cluster-firm/ sector charact.	S.E cluster-sector
Equity	0.0242	0.0242	0.0242	-0.00197	-0.00197	-0.00197	-0.00197
	(0.0386)	(0.0870)	(0.0880)	(0.0658)	(0.114)	(0.0808)	(0.124)
FIS	0.0900***	0.0900**	0.0900***	0.241***	0.241**	0.241***	0.241**
	(0.0272)	(0.0405)	(0.0318)	(0.0529)	(0.0951)	(0.0879)	(0.112)
PLS	0.0146	0.0146	0.0146	0.0784**	0.0784	0.0784**	0.0784
	(0.0153)	(0.0244)	(0.0256)	(0.0330)	(0.0526)	(0.0379)	(0.0755)
ZCS	0.0616**	0.0616*	0.0616*	0.317***	0.317***	0.317***	0.317***
	(0.0263)	(0.0370)	(0.0369)	(0.0501)	(0.0714)	(0.0550)	(0.0825)
Do Nothing	-0.190***	-0.190**	-0.190**	-0.635***	-0.635***	-0.635***	-0.635***
	(0.0460)	(0.0890)	(0.0820)	(0.0829)	(0.134)	(0.105)	(0.0867)
Observations	2,675	2,675	2,675	2,668	2,668	2,668	2,668

This table reports the impact of constrained deficit ($\alpha^{D(max)}$) on the probability of issuing each external funding source. It reports marginal effects of the maximum debt capacity condition under liberal pecking order. In this stage, firms maintain debt capacity equal to firms' historical averages. Probabilities are obtained from estimating Equation(IV.2).Variables definitions are shown in table III.3. Funding tools are: equity, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), and doing nothing. In (1) constrained deficit is the only explanatory variable. In (2) we add firm characteristics as explanatory variables. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.12.: Marginal effects of firm characteristics in the semi-liberal specification

Stage 1								
Instrument	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.00957***	0.0337*	-0.00372	-0.0305	0.00547	0.0290	0.00467***	-1.53e-06**
	(0.00261)	(0.0187)	(0.00337)	(0.142)	(0.00672)	(0.0198)	(0.00116)	(6.75e-07)
FIS	0.0130***	-0.00760	0.00480**	-0.158*	-0.00787**	-0.0143	-0.00568	3.83e-07
	(0.00360)	(0.0209)	(0.00243)	(0.0917)	(0.00378)	(0.0248)	(0.00423)	(2.26e-06)
PLS	0.00835***	-0.0141	-0.00150	-0.0287	0.0175**	8.08e-05	-0.00818**	-1.99e-07
	(0.00213)	(0.0140)	(0.00380)	(0.0983)	(0.00847)	(0.0136)	(0.00416)	(4.13e-07)
ZCS	-0.00492	-0.0296	-0.0176**	-0.122	0.0131	0.130***	0.00442**	-2.60e-06**
	(0.00479)	(0.0287)	(0.00683)	(0.107)	(0.0118)	(0.0258)	(0.00220)	(1.24e-06)
Bank Loans	0.00308	0.00999	0.0109	0.129	0.0912***	-0.325***	-0.0434***	-2.28e-06
	(0.00859)	(0.0514)	(0.00826)	(0.345)	(0.0289)	(0.0620)	(0.0101)	(2.80e-06)
Do Nothing	-0.0290***	0.00756	0.00708	0.210	-0.119***	0.180***	0.0481***	6.23e-06*
	(0.00952)	(0.0562)	(0.00955)	(0.343)	(0.0275)	(0.0657)	(0.00956)	(3.20e-06)
Observations	2,759	2,759	2,759	2,759	2,759	2,759	2,759	2,759

Stage 2								
Instrument	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Equity	0.0689***	0.0479	-0.0466***	2.093***	-0.0301	-0.187*	0.0146*	-8.10e-06**
	(0.0119)	(0.0522)	(0.0120)	(0.637)	(0.0365)	(0.108)	(0.00882)	(3.96e-06)
FIS	-0.00395	0.0650**	0.0302***	-1.067***	0.00854	0.105	-0.0104	3.18e-06
	(0.00789)	(0.0276)	(0.00489)	(0.262)	(0.0235)	(0.114)	(0.0104)	(2.51e-06)
PLS	0.0334***	-0.0507**	0.000581	0.279	-0.0351***	0.0303	0.00698***	-3.92e-08
	(0.00767)	(0.0219)	(0.00417)	(0.188)	(0.0102)	(0.0306)	(0.00202)	(1.29e-06)
ZCS	-0.0201***	0.0908**	-0.0257***	-0.407*	0.0575***	0.0661	-0.00249	-6.72e-06***
	(0.00682)	(0.0405)	(0.00992)	(0.215)	(0.0201)	(0.0592)	(0.00359)	(2.59e-06)
Do Nothing	-0.0783***	-0.153**	0.0415***	-0.898	-0.000777	-0.0137	-0.00872	1.17e-05**
	(0.0137)	(0.0641)	(0.0149)	(0.619)	(0.0389)	(0.124)	(0.0107)	(4.81e-06)
Observations	1,517	1,517	1,517	1,517	1,517	1,517	1,517	1,517

This table reports the impact of firm characteristics and macroeconomic factors on the probability of issuing each external funding source under the *semi-liberal* pecking order specification. In this specification, firms hold savings and debt capcity equal to the industry average. **In stage 1** probabilities are obtained from estimating Equation (IV.1). Variables definitions are shown in table III.3. Funding tools are: bonds, Fixed income sukuk (FIS), profit-loss-sharing (PLS) sukuk, zero-coupon sukuk (ZCS), bank loans, and doing nothing. **In stage 2** probabilities are obtained from estimating Equation (IV.2). Variables definitions are shown in Table III.3. Funding tools are: equity, Fixed income sukuk (FIS), profit-loss-sharing (PLS) sukuk, zero-coupon sukuk (ZCS), and doing nothing. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.13.: Marginal effects of firm characteristics in the liberal specification

Stage 1								
Instrument	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.00921***	5.92e-06	-0.0194***	-0.162	0.0101	0.0643***	0.00425***	-1.66e-06***
	(0.00257)	(0.0200)	(0.00514)	(0.139)	(0.00911)	(0.0213)	(0.00117)	(6.33e-07)
FIS	0.0135***	0.00543	0.00757***	-0.172	-0.00806*	-0.0294	-0.00279	8.31e-07
	(0.00273)	(0.0225)	(0.00289)	(0.122)	(0.00432)	(0.0259)	(0.00465)	(2.52e-06)
PLS	0.0132***	-0.0236	0.00444	-0.181**	0.0155*	0.0168	-0.00199	-1.26e-07
	(0.00270)	(0.0191)	(0.00271)	(0.0884)	(0.00918)	(0.0209)	(0.00400)	(8.57e-07)
ZCS	-0.00623**	-0.0165	-0.0127**	-0.0659	-0.00238	0.0521***	0.00511***	-2.16e-06*
	(0.00299)	(0.0247)	(0.00572)	(0.0868)	(0.00635)	(0.0195)	(0.00165)	(1.14e-06)
Bank Loans	-0.0360***	0.0686	-0.00130	0.470	0.0873***	-0.246***	-0.0575***	-6.19e-07
	(0.00631)	(0.0502)	(0.00918)	(0.333)	(0.0271)	(0.0590)	(0.0105)	(2.85e-06)
Observations	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808

Stage 2								
Instrument	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Equity	0.0472***	-0.0819*	-0.00470	1.026**	0.0365	0.101	0.00779*	-4.28e-06*
	(0.00583)	(0.0436)	(0.00636)	(0.494)	(0.0241)	(0.0931)	(0.00456)	(2.59e-06)
FIS	0.0103***	0.0338	0.0118***	-0.287	-0.0243*	0.167*	-0.00819	7.09e-07
	(0.00303)	(0.0231)	(0.00331)	(0.180)	(0.0130)	(0.0897)	(0.00716)	(2.69e-06)
PLS	0.0135***	-0.0141	0.00209	-0.0368	0.000705	0.0926**	0.00259	-4.23e-07
	(0.00314)	(0.0157)	(0.00456)	(0.167)	(0.0113)	(0.0393)	(0.00316)	(8.31e-07)
ZCS	-0.0197***	0.00626	-0.0158**	-0.0837	0.0110	0.354***	-0.00371	-3.32e-06
	(0.00346)	(0.0273)	(0.00797)	(0.173)	(0.0145)	(0.0521)	(0.00286)	(2.42e-06)
Do Nothing	-0.0513***	0.0559	0.00655	-0.619	-0.0239	-0.714***	0.00152	7.32e-06**
	(0.00672)	(0.0504)	(0.0105)	(0.508)	(0.0279)	(0.113)	(0.00634)	(3.64e-06)
Do Nothing	0.00634	-0.0340	0.0214**	0.110	-0.103***	0.142**	0.0530***	3.74e-06
	(0.00708)	(0.0557)	(0.0106)	(0.347)	(0.0256)	(0.0637)	(0.01000)	(3.44e-06)
Observations	2,668	2,668	2,668	2,668	2,668	2,668	2,668	2,668

This table reports the impact of firm characteristics and macroeconomic factors on the probability of issuing each external funding source under the *liberal* pecking order specification. In this version, firms savings and debt capacity are firm determinants. They are equal to individuals firms' historical savings and leverage averages. **In stage 1** probabilities are obtained from estimating Equation (IV.1). Variables definitions are shown in Table III.3. Funding tools are: bonds, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), bank loans, and doing nothing. **In stage 2** probabilities are obtained from estimating Equation (IV.2). Variables definitions are shown in table III.3. Funding tools are: equity, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), and doing nothing. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.14.: Marginal effects of sector in the semi-liberal specification

Stage 1										
VARIABLES	Energy	Materials	Industrial	Consumer Discri.	Consumer Stap.	Healthcare	Telecom.	Utilities	Real Estate	Technology
Bonds	base	-0.00330	0.0274***	0.0109	0.0309**	0.00786	0.0264	0.0202	0.0107	-0.0136**
		(0.00878)	(0.00934)	(0.0104)	(0.0133)	(0.0223)	(0.0171)	(0.0142)	(0.0131)	(0.00651)
FIS		0.0258*	0.0367***	-0.00468	0.0792***	0.112***	0.0205	0.00547	0.0129	-0.0159**
		(0.0151)	(0.0105)	(0.00943)	(0.0293)	(0.0348)	(0.0156)	(0.0156)	(0.0113)	(0.00696)
PLS		0.0104	0.0151***	0.0181**	0.0101	-3.31e-09	0.00313	0.0122	0.0123	-4.66e-10
		(0.00771)	(0.00478)	(0.00827)	(0.0110)		(0.00342)	(0.00863)	(0.00764)	(1.69e-09)
ZCS		0.0529**	-0.00681	0.0142	0.0723**	-0.0168	-0.0440***	-0.0440***	-0.0228	0.110**
		(0.0216)	(0.0152)	(0.0168)	(0.0330)	(0.0292)	(0.0127)	(0.0127)	(0.0162)	(0.0505)
Bank Loans		-0.0868**	-0.109***	-0.113***	-0.0372	-0.124**	-0.150***	-0.214***	-0.134***	-0.137**
		(0.0407)	(0.0343)	(0.0388)	(0.0499)	(0.0604)	(0.0491)	(0.0452)	(0.0426)	(0.0656)
Do Nothing		0.000971	0.0364	0.0745*	-0.155***	0.0211	0.144***	0.220***	0.121***	0.0561
		(0.0420)	(0.0358)	(0.0404)	(0.0526)	(0.0674)	(0.0520)	(0.0470)	(0.0448)	(0.0770)
Observations	2,759	2,759	2,759	2,759	2,759	2,759	2,759	2,759	2,759	2,759
Stage 2										
VARIABLES	Energy	Materials	Industrial	Consumer Discri.	Consumer Stap.	Healthcare	Telecom.	Utilities	Real Estate	Technology
Equity	base	-0.136***	0.0283	-0.119**	-0.0371	0.266***	-0.0587	-0.126**	-0.0689	-0.0948
		(0.0470)	(0.0471)	(0.0478)	(0.0586)	(0.0681)	(0.0557)	(0.0568)	(0.0518)	(0.0997)
FIS		0.0131	0.0475*	-0.0377**	0.00619	-0.0178	0.0326	0.0567	0.0203	-0.0428***
		(0.0254)	(0.0251)	(0.0169)	(0.0244)	(0.0177)	(0.0352)	(0.0492)	(0.0281)	(0.0161)
PLS		-0.0129	0.0108	0.136***	0.0681	-0.0116	-0.00680	-0.00978	0.0663***	-0.0116
		(0.0106)	(0.0122)	(0.0298)	(0.0553)	(0.0106)	(0.0111)	(0.0109)	(0.0207)	(0.0106)
ZCS		0.127***	0.0298*	0.0632***	0.118***	-0.00288	-0.0264**	-0.0264**	0.0413	0.0386
		(0.0287)	(0.0172)	(0.0206)	(0.0363)	(0.0264)	(0.0119)	(0.0119)	(0.0268)	(0.0399)
Do Nothing		0.00821	-0.116**	-0.0425	-0.155**	-0.233***	0.0593	0.106	-0.0591	0.111
		(0.0544)	(0.0502)	(0.0505)	(0.0651)	(0.0713)	(0.0626)	(0.0686)	(0.0582)	(0.105)

This table reports the impact of sector on the probability of issuing each external funding source under the *semi-liberal* pecking order. In this specification, firms hold savings and debt capcity equal to the industry average. **In stage 1** probabilities are obtained from estimating Equation (IV.1). Variables definitions are shown in Table III.3. Funding tools are: bonds, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), bank loans, and doing nothing. **In stage 2** probabilities are obtained from estimating Equation (IV.2). Variables definitions are shown in table III.3. Funding tools are: equity, Fixed income sukuk (FIS), profit-loss-sharing(PLS) sukuk, zero-coupon sukuk (ZCS), and doing nothing. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.15.: Marginal effects of sector in the liberal specification

Stage 1										
VARIABLES	Energy	Materials	Industrial	Consumer Discri.	Consumer Stap.	Healthcare	Telecom.	Utilities	Real Estate	Technology
Bonds		-0.0106	0.0293***	-0.00300	0.0774***	0.0250	0.00503	0.0251*	-0.00580	-0.0185**
		(0.00969)	(0.0106)	(0.0106)	(0.0234)	(0.0423)	(0.0160)	(0.0138)	(0.0105)	(0.00795)
PLS		0.0196	0.0386***	0.00716	0.0225	0.151***	0.0600***	0.0333*	0.0226*	-0.0159**
		(0.0141)	(0.0104)	(0.0106)	(0.0183)	(0.0425)	(0.0198)	(0.0179)	(0.0132)	(0.00694)
FIS		0.0189*	0.0172***	0.0310***	-2.65e-09***	-1.40e-09	0.00350	-2.70e-09***	0.0417**	-2.23e-10
		(0.0112)	(0.00464)	(0.0116)	(6.70e-10)	(1.75e-09)	(0.00381)	(6.40e-10)	(0.0202)	(2.12e-09)
ZCS		0.0186	-0.0340**	-0.0311*	0.0385	-0.0372	-0.0629***	-0.0629***	-0.0411**	0.0696
		(0.0225)	(0.0171)	(0.0180)	(0.0332)	(0.0294)	(0.0158)	(0.0158)	(0.0189)	(0.0470)
Bank Loans		-0.0736**	-0.0546*	-0.0967***	0.0666	-0.100	-0.0968**	-0.132***	-0.126***	-0.0887
		(0.0374)	(0.0312)	(0.0351)	(0.0501)	(0.0612)	(0.0477)	(0.0463)	(0.0377)	(0.0630)
Do Nothing		0.0271	0.00362	0.0926**	-0.205***	-0.0387	0.0912*	0.136***	0.109**	0.0534
		(0.0404)	(0.0332)	(0.0382)	(0.0519)	(0.0742)	(0.0512)	(0.0481)	(0.0429)	(0.0715)
Observations	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808	2,808
Stage 2										
VARIABLES	Energy	Materials	Industrial	Consumer Discri.	Consumer Stap.	Healthcare	Telecom.	Utilities	Real Estate	Technology
Equity		-0.0339	0.0726**	-0.0563*	0.171***	0.517***	0.0687*	0.0588	0.0122	0.0992
		(0.0338)	(0.0293)	(0.0324)	(0.0471)	(0.0552)	(0.0397)	(0.0385)	(0.0341)	(0.0857)
FIS		0.0240	0.0464***	0.0192	0.0535**	0.0212	0.0655***	0.0264	0.0204	-0.0277***
		(0.0182)	(0.0137)	(0.0155)	(0.0245)	(0.0197)	(0.0220)	(0.0190)	(0.0160)	(0.00947)
PLS		0.00856	0.0219***	0.0487***	0.00152	-0.00562	0.000231	0.000115	0.0380*	-0.00562
		(0.0114)	(0.00831)	(0.0187)	(0.00939)	(0.00552)	(0.00701)	(0.00780)	(0.0207)	(0.00552)
ZCS		0.0411	-0.0383*	-0.0159	0.0484	-0.0681***	-0.0854***	-0.0854***	-0.0588***	0.0353
		(0.0270)	(0.0207)	(0.0215)	(0.0295)	(0.0254)	(0.0191)	(0.0191)	(0.0226)	(0.0462)
Bank Loans		-0.0398	-0.103***	0.00429	-0.274***	-0.464***	-0.0491	8.00e-05	-0.0118	-0.101
		(0.0431)	(0.0357)	(0.0405)	(0.0532)	(0.0572)	(0.0459)	(0.0426)	(0.0420)	(0.0934)
Observations	2,668	2,668	2,668	2,668	2,668	2,668	2,668	2,668	2,668	2,668

This table reports the impact sector on the probability of issuing each external funding source under the liberal pecking order specification. In this version, firms savings and debt capacity are firm determinants. They are equal to individuals firms' historical savings and leverage averages. **In stage 1** probabilities are obtained from estimating Equation (IV.1). Variables definitions are shown in Table III.3. Funding tools are: bonds, Fixed income sukuk (FIS), profit-loss-sharing (PLS) sukuk, zero-coupon sukuk (ZCS), bank loans, and doing nothing. **In stage 2** probabilities are obtained from estimating Equation (IV.2). Variables definitions are shown in table III.3. Funding tools are: equity, Fixed income sukuk (FIS), profit-loss-sharin g(PLS) sukuk, zero-coupon sukuk (ZCS), and doing nothing.Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.16.: Expected and observed signs

Stage 1										
	Expected Signs		Semi-liberal pecking order				Liberal pecking order			
Determinants	Sukuk	Bonds	FIS	PLS	ZC	Bonds	FIS	PLS	ZC	Bonds
Size	(-)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(-)	(+)
Tangibility	(-/+)	(+)	(+)	(+)	(-)	(+)	(+)	(-)	(-)	(-)
Growth	(-)	(+)	(+)	(+)	(-)	(-)	(+)	(+)	(-)	(-)
Profitability	(-)	(+)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Solvency	(-)	(+)	(-)	(+)	(+)	(+)	(-)	(+)	(-)	(+)
Leverage	(-)	(+)	(-)	(-)	(+)	(+)	(-)	(-)	(+)	(+)
Liquidity	(-/+)	(-/+)	(-)	(-)	(+)	(+)	(-)	(-)	(+)	(+)
Stage 2										
	Expected Signs		Semi-liberal pecking order				Liberal pecking order			
	Sukuk	Equity	FIS	PLS	ZC	Equity	FIS	PLS	ZC	Equity
Size	(+)	(-)	(+)	(+)	(-)	(+)	(+)	(+)	(-)	(+)
Tangibility	(+)	(-/+)	(+)	(-)	(+)	(+)	(+)	(-)	(-)	(-)
Growth	(+)	(-)	(+)	(+)	(-)	(-)	(+)	(+)	(-)	(-)
Profitability	(+)	(-)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
Solvency	(+)	(-)	(+)	(-)	(+)	(-)	(-)	(-)	(+)	(+)
Leverage	(+)	(-)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)
Liquidity	(-/+)	(-/+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)

In this table we present the expected and obtained signs of the relationship between source of funding and firm characteristics. In stage 1, firms exhaust internal funds and are to choose between the issuances of sukuk types and conventional bonds. In stage 2, firms reach maximum debt capacity and can raise funds by issuing sukuk or equity. In the semi-liberal specification, deficit is constrained by the industrial average of savings and leverage. In the liberal version, firms savings and leverage are firm determinant and calculated as annual historical averages. In the first panel, we show and compare the expected direction of the affect of firm characteristics on the issuance of sukuk types and conventional bonds. In the second panel, we show and compare the expected direction of the affect of firm characteristics on the issuance of sukuk types and shares. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable.

Table III.17.: Robustness check- Emerging markets semi-liberal pecking order

Stage 1									
VARIABLES	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.0284	0.00102	0.0337***	-0.00219	0.0211	0.00880	0.000961	0.000179	-9.44e-07
	(0.0176)	(0.00226)	(0.0112)	(0.00262)	(0.0424)	(0.00611)	(0.0156)	(0.00182)	(6.82e-07)
FIS	-0.000473	0.00484*	0.0116	0.00399**	-0.116	-0.00649**	-0.0217	-0.00903*	-2.02e-07
	(0.00875)	(0.00294)	(0.0165)	(0.00161)	(0.0725)	(0.00323)	(0.0219)	(0.00486)	(1.55e-06)
PLS	-0.00353	0.00442***	0.00184	-0.000815	-0.0106	0.00777	-0.00740	-0.00482	-1.70e-07
	(0.00249)	(0.00144)	(0.00892)	(0.00268)	(0.0728)	(0.00604)	(0.0103)	(0.00329)	(2.25e-07)
ZCS	0.0230	-0.00635	-0.0231	-0.0162**	-0.107	0.0107	0.116***	0.00379*	-2.37e-06**
	(0.0146)	(0.00408)	(0.0249)	(0.00641)	(0.0955)	(0.0104)	(0.0226)	(0.00197)	(1.02e-06)
Equity	0.0332	0.0471***	-0.131***	0.00538	0.253	0.0122	0.0920**	0.0148***	-8.36e-07
	(0.0279)	(0.00631)	(0.0375)	(0.00329)	(0.236)	(0.0219)	(0.0430)	(0.00375)	(1.50e-06)
Bank Loans	-0.0532***	-0.00655	0.0353	0.00532	0.0395	0.0758***	-0.303***	-0.0430***	-2.09e-06
	(0.0141)	(0.00768)	(0.0453)	(0.00776)	(0.325)	(0.0260)	(0.0553)	(0.00942)	(2.44e-06)
Do Nothing	-0.0274	-0.0445***	0.0714	0.00454	-0.0791	-0.109***	0.124*	0.0381***	6.61e-06**
	(0.0251)	(0.00917)	(0.0533)	(0.00890)	(0.339)	(0.0280)	(0.0635)	(0.00833)	(2.98e-06)
Observations	3,144	3,144	3,144	3,144	3,144	3,144	3,144	3,144	3,144
Stage 2									
VARIABLES	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.0486**	0.00326	0.0226	-0.0447**	-0.220*	0.0182*	0.0973***	-0.000268	-1.85e-07
	(0.0202)	(0.00303)	(0.0157)	(0.0186)	(0.131)	(0.00995)	(0.0366)	(0.00181)	(1.28e-06)
FIS	0.159***	-0.00410	0.0576***	0.0226***	-0.670***	0.00797	0.0973	-0.00715	1.96e-06
	(0.0574)	(0.00536)	(0.0204)	(0.00346)	(0.186)	(0.0189)	(0.0786)	(0.00929)	(1.90e-06)
PLS	-0.0117*	0.0183***	-0.0249*	-0.00139	0.184**	-0.0201***	0.0282	0.00459***	-5.93e-07
	(0.00705)	(0.00534)	(0.0135)	(0.00351)	(0.0868)	(0.00637)	(0.0200)	(0.00141)	(8.39e-07)
ZCS	0.0282	-0.0118**	0.0472	-0.0120*	-0.321*	0.0348**	0.116**	0.00422	-4.19e-06*
	(0.0262)	(0.00572)	(0.0335)	(0.00712)	(0.181)	(0.0161)	(0.0461)	(0.00295)	(2.31e-06)
Equity	0.0187	0.0567***	0.0298	-0.0254**	1.022***	-0.0423	-0.0711	0.0235***	-2.52e-06
	(0.0635)	(0.00992)	(0.0447)	(0.0100)	(0.320)	(0.0311)	(0.0942)	(0.00771)	(3.32e-06)
Bank Loans	-0.0242	-0.00508	-0.0469	0.0279**	0.396	0.0604*	-0.436***	-0.0477***	-8.79e-06**
	(0.0371)	(0.0103)	(0.0524)	(0.0122)	(0.405)	(0.0366)	(0.0968)	(0.0124)	(3.84e-06)
Do Nothing	-0.219***	-0.0574***	-0.0854	0.0329**	-0.391	-0.0590	0.168	0.0229*	1.43e-05***
	(0.0544)	(0.0121)	(0.0607)	(0.0155)	(0.499)	(0.0386)	(0.109)	(0.0117)	(4.65e-06)
Observations	1,988	1,988	1,988	1,988	1,988	1,988	1,988	1,988	1,988

This table show the impact of constrained deficit and firm characteristics on the probability of issuing each external funding instrument under the semi-liberal pecking order specification. In this version, firms' saving and leverage levels are equal to the industry average. We re-estimate Equations IV.1 and IV.2 while allowing firms to issue bonds and equity in both stages, in addition to issuing sukuk. Therefore, in both estimations, the dependent variable takes values 1 - 7 as follows: conventional bonds, profit-loss sharing (PLS), Fixed income sukuk (FIS), zero-coupon sukuk (ZCS), equity, bank loans, and do nothing. All variables definitions are shown in Table III.3. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.18.: Robustness check- Emerging markets liberal pecking order

Stage 1									
VARIABLES	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity GDP	
Bonds	0.0155	0.00395***	0.0220**	-0.0207**	-0.00178	0.00389	0.0251	0.00130	-1.07e-06**
	(0.0242)	(0.00129)	(0.0106)	(0.00859)	(0.0724)	(0.00610)	(0.0170)	(0.00142)	(5.42e-07)
FIS	0.0383	0.00474**	0.0341**	0.00553***	-0.144	-0.00710**	-0.0290	-0.00663	-3.21e-09
	(0.0432)	(0.00202)	(0.0168)	(0.00193)	(0.0891)	(0.00346)	(0.0210)	(0.00473)	(1.54e-06)
PLS	0.0148	0.00709***	-0.00159	0.00386**	-0.0924*	0.00329	0.00126	-0.000865	-1.45e-07
	(0.0260)	(0.00188)	(0.0118)	(0.00196)	(0.0529)	(0.00560)	(0.0177)	(0.00327)	(4.61e-07)
ZCS	0.120***	-0.00684***	-0.0114	-0.0112**	-0.0507	-0.00299	0.0464***	0.00436***	-1.94e-06**
	(0.0382)	(0.00252)	(0.0209)	(0.00517)	(0.0708)	(0.00505)	(0.0165)	(0.00142)	(9.25e-07)
Equity	-0.158**	0.0534***	-0.160***	0.00618	0.336	0.0383*	0.113***	0.00943**	-1.31e-06
	(0.0658)	(0.00491)	(0.0392)	(0.00428)	(0.305)	(0.0206)	(0.0436)	(0.00383)	(1.62e-06)
Bank Loans	-0.384***	-0.0426***	0.0803*	-0.00442	0.291	0.0707***	-0.228***	-0.0526***	-5.70e-07
	(0.0768)	(0.00561)	(0.0438)	(0.00870)	(0.291)	(0.0242)	(0.0523)	(0.00954)	(2.38e-06)
Do Nothing	0.353***	-0.0198***	0.0361	0.0208*	-0.337	-0.106***	0.0706	0.0450***	5.04e-06*
	(0.0963)	(0.00655)	(0.0519)	(0.0109)	(0.391)	(0.0251)	(0.0608)	(0.00825)	(3.01e-06)
Observations	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272
Stage 2									
VARIABLES	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.0539*	0.00153	0.0204**	-0.00667	0.0548	0.00794	0.0620**	-0.00132	-9.30e-07
	(0.0309)	(0.00130)	(0.00998)	(0.00522)	(0.0513)	(0.00678)	(0.0249)	(0.00235)	(8.42e-07)
FIS	0.106**	0.00564***	0.0379**	0.00607***	-0.260**	-0.00949	0.0810	-0.00892	4.86e-08
	(0.0520)	(0.00208)	(0.0170)	(0.00214)	(0.124)	(0.0111)	(0.0566)	(0.00655)	(1.51e-06)
PLS	0.0586**	0.00721***	-0.00623	0.000682	0.0186	-0.00751	0.0666***	0.00252	-3.15e-07
	(0.0229)	(0.00185)	(0.00952)	(0.00232)	(0.0932)	(0.00585)	(0.0243)	(0.00155)	(4.24e-07)
ZCS	0.189***	-0.00748***	-0.0157	-0.00910	-0.100	-0.00436	0.260***	0.00362*	-2.50e-06**
	(0.0378)	(0.00253)	(0.0222)	(0.00606)	(0.108)	(0.00978)	(0.0378)	(0.00213)	(1.17e-06)
Equity	0.0616	0.0513***	-0.0963***	0.000303	0.505*	0.0148	0.163**	0.0185***	-1.94e-06
	(0.0597)	(0.00466)	(0.0359)	(0.00427)	(0.274)	(0.0187)	(0.0709)	(0.00391)	(1.67e-06)
Bank Loans	-0.153***	-0.0448***	0.0686*	0.00374	0.380	0.0752***	-0.401***	-0.0545***	-1.27e-06
	(0.0535)	(0.00545)	(0.0416)	(0.00843)	(0.315)	(0.0242)	(0.0690)	(0.00932)	(2.28e-06)
Do Nothing	-0.317***	-0.0135**	-0.00857	0.00498	-0.599	-0.0765***	-0.232***	0.0400***	6.91e-06**
	(0.0690)	(0.00612)	(0.0473)	(0.00930)	(0.418)	(0.0257)	(0.0844)	(0.00788)	(3.07e-06)
Observations	3,599	3,599	3,599	3,599	3,599	3,599	3,599	3,599	3,599

This table show the impact of constrained deficit and firm characteristics on the probability of issuing each external funding instrument under the liberal pecking order specification. In this version, firms' saving and leverage levels are firm determinant (computed as historical annual averages). We re-estimate Equations IV.1 and IV.2 while allowing firms to issue bonds and equity in both stages, in addition to issuing sukuk. Therefore, in both estimations, the dependent variable takes values 1 - 7 as follows: conventional bonds, profit-loss sharing (PLS), Fixed income sukuk (FIS), zero-coupon sukuk (ZCS), equity, bank loans, and do nothing. Variables definitions are shown in Table III.3. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets +Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.19.: Robustness check - Debt-equity features of sukuk in the semi-liberal specification

Stage 1									
Instrument	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.00751	0.00993***	0.0328*	-0.00387	-0.0298	0.00604	0.0291	0.00434***	-1.53e-06**
	(0.0103)	(0.00267)	(0.0189)	(0.00342)	(0.141)	(0.00671)	(0.0199)	(0.00115)	(6.70e-07)
FIS	0.00167	0.0136***	-0.00949	0.00468*	-0.160*	-0.00663*	-0.0142	-0.00650	4.27e-07
	(0.0123)	(0.00369)	(0.0210)	(0.00245)	(0.0924)	(0.00371)	(0.0249)	(0.00431)	(2.28e-06)
ZCS	0.0286*	-0.00475	-0.0302	-0.0177**	-0.125	0.0136	0.131***	0.00427*	-2.67e-06**
	(0.0170)	(0.00485)	(0.0290)	(0.00690)	(0.108)	(0.0119)	(0.0260)	(0.00223)	(1.23e-06)
Bank Loans	-0.0453***	0.00528	0.00688	0.0108	0.117	0.0968***	-0.328***	-0.0460***	-2.33e-06
	(0.0134)	(0.00868)	(0.0518)	(0.00828)	(0.347)	(0.0290)	(0.0623)	(0.0101)	(2.81e-06)
Do Nothing	0.00752	-0.0241**	-8.75e-06	0.00608	0.198	-0.110***	0.182***	0.0439***	6.10e-06*
	(0.0190)	(0.00959)	(0.0562)	(0.00939)	(0.341)	(0.0272)	(0.0656)	(0.00943)	(3.20e-06)
Observations	2,728	2,728	2,728	2,728	2,728	2,728	2,728	2,728	2,728
Stage 2									
Instrument	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
PLS	-0.0131	0.0241***	-0.0364*	-0.00172	0.281**	-0.0281***	0.0285	0.00629***	-1.63e-06
	(0.0102)	(0.00739)	(0.0193)	(0.00604)	(0.128)	(0.0102)	(0.0275)	(0.00225)	(1.31e-06)
Equity	0.140**	0.0156	0.0652	-0.0455***	2.263***	-0.0555	-0.160	0.00182	-1.01e-05**
	(0.0664)	(0.0142)	(0.0620)	(0.0145)	(0.770)	(0.0403)	(0.122)	(0.00982)	(4.64e-06)
Do Nothing	-0.127**	-0.0397***	-0.0288	0.0472***	-2.543***	0.0836**	0.131	-0.00810	1.18e-05**
	(0.0639)	(0.0146)	(0.0632)	(0.0150)	(0.786)	(0.0396)	(0.122)	(0.00980)	(4.75e-06)
Observations	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303

This table show the impact of constrained deficit and firm characteristics on the probability of issuing each external funding instrument under the semi-liberal pecking order specification. In this version, firms' saving and leverage levels are equal to the industry average. We re-estimate Equations IV.1 for stage 1 and IV.2 for stage 2, accounting for the debt-equity characteristics of sukuk. Variables definitions are shown in Table III.3. In stage 1,the funding tools are: conventional bonds, fixed income sukuk (FIS), zero-coupon sukuk (ZCS), bank loans and do nothing. While in the second stage, the funding tools are: profit-loss sharing sukuk (PLS), shares, and do nothing. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets + Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

Table III.20.: Robustness check- Debt-equity features of sukuk in the liberal specification

Stage 1									
Instrument	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
Bonds	0.0874**	0.0169***	0.00334	-0.0218***	-0.231	0.0125	0.0817***	0.00678***	-1.82e-06***
	(0.0386)	(0.00328)	(0.0219)	(0.00614)	(0.160)	(0.0108)	(0.0252)	(0.00146)	(7.06e-07)
FIS	0.116*	0.0246***	0.00820	0.0100***	-0.229	-0.00913*	-0.0195	-0.000534	1.51e-06
	(0.0649)	(0.00354)	(0.0247)	(0.00344)	(0.143)	(0.00517)	(0.0296)	(0.00464)	(3.17e-06)
ZCS	0.187***	-0.000190	-0.0220	-0.0144**	-0.0954	-0.00311	0.0605***	0.00587***	-3.40e-06***
	(0.0540)	(0.00362)	(0.0292)	(0.00670)	(0.103)	(0.00831)	(0.0229)	(0.00204)	(1.01e-06)
Bank Loans	-0.413***	-0.00697	0.0903	0.00269	0.566	0.0860***	-0.322***	-0.0559***	-8.98e-08
	(0.0985)	(0.00761)	(0.0566)	(0.0104)	(0.391)	(0.0300)	(0.0668)	(0.0107)	(3.37e-06)
Do Nothing	0.0227	-0.0344***	-0.0799	0.0235**	-0.0106	-0.0863***	0.200***	0.0438***	3.80e-06
	(0.106)	(0.00793)	(0.0597)	(0.0114)	(0.380)	(0.0266)	(0.0685)	(0.00962)	(3.62e-06)
Observations	2,433	2,433	2,433	2,433	2,433	2,433	2,433	2,433	2,433
Stage 2									
Instrument	Deficit	Size	Tangibility	Growth	Profitability	Solvency	Leverage	Liquidity	GDP
PLS	0.119**	0.00950***	-0.00263	0.00200	0.0547	-0.00997	0.117***	0.00175	-6.95e-07
	(0.0470)	(0.00275)	(0.0146)	(0.00456)	(0.136)	(0.00920)	(0.0450)	(0.00259)	(7.06e-07)
Equity	0.170*	0.0619***	-0.0862*	-0.00256	0.828	0.0421	0.245**	0.00572	-4.66e-06*
	(0.0948)	(0.00639)	(0.0485)	(0.00718)	(0.514)	(0.0267)	(0.108)	(0.00439)	(2.69e-06)
Do Nothing	-0.289***	-0.0714***	0.0888*	0.000566	-0.883*	-0.0321	-0.362***	-0.00747*	5.36e-06*
	(0.0960)	(0.00638)	(0.0488)	(0.00763)	(0.517)	(0.0268)	(0.109)	(0.00452)	(2.78e-06)
Observations	2,375	2,375	2,375	2,375	2,375	2,375	2,375	2,375	2,375

This table show the impact of constrained deficit and firm characteristics on the probability of issuing each external funding instrument under the liberal pecking order specification. In this version, firms' saving and leverage levels are firm determinant (computed as historical annual averages). We re-estimate Equations IV.1 for stage 1 and IV.2 for stage 2, accounting for the debt-equity characteristics of sukuk. Variables definitions are shown in Table III.3. In stage 1,the funding tools are: conventional bonds, fixed income sukuk (FIS), zero-coupon sukuk (ZCS), bank loans and do nothing. While in the second stage, the funding tools are: profit-loss sharing sukuk (PLS), shares, and do nothing. Firm size is measured by the natural logarithm of total assets. Tangibility is measured by the ratio of total fixed assets to total assets. We measure growth opportunity as [Total Assets + Book Equity + (No of Shares outstanding * Share price)]/Total Assets. The return on assets ratio (ROA) is used to measure firm profitability. We measure solvency or credit solvency by Altman z-score. Leverage is the total debt to total asset ratio. We use GDP growth as a macroeconomic control variable. Standard errors in parentheses. Significance levels are represented by: *** p<0.01, ** p<0.05, * p<0.1.

II. Figures

Figure III.1.: Leary and Roberts (2010) illustration of the pecking order theory funding resources hierarchy

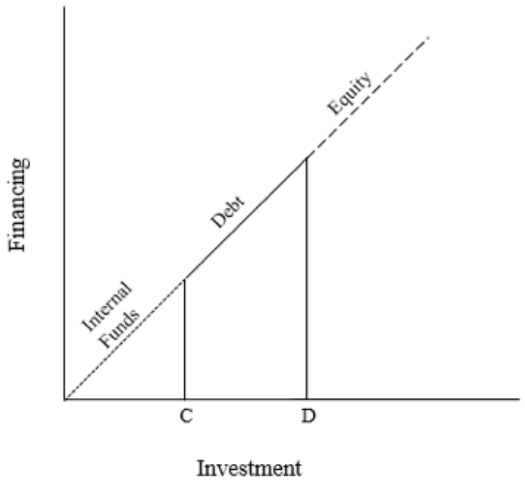
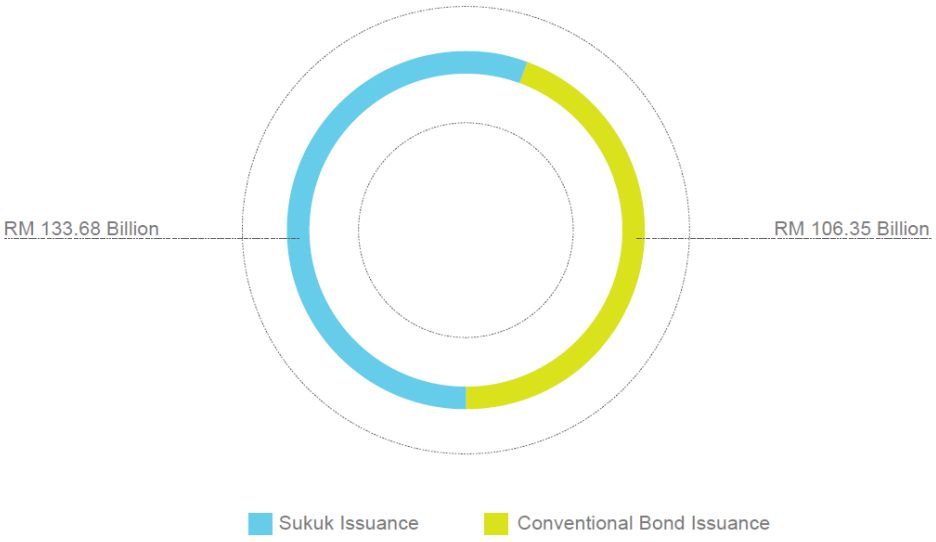
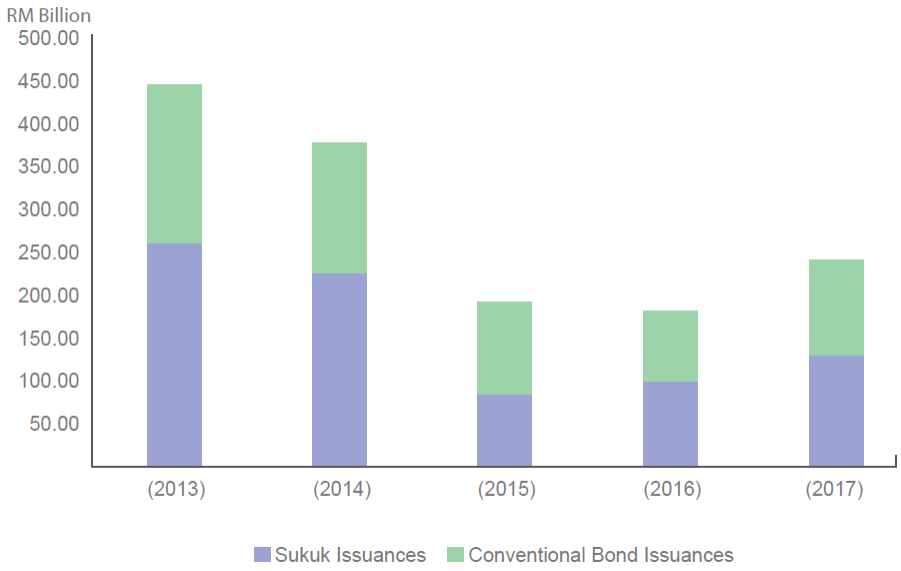


Figure III.2.: The value of Malaysian sukuk and conventional bonds isuances in 2017.



Source: International Islamic Financial Market(IIFM) Annual Sukuk Report,2018

Figure III.3.: The issuances of sukuk and conventional bonds in Malaysia in the period 2013–2017.



Source: International Islamic Financial Market(IIFM) Annual Sukuk Report,2018

Figure III.4.: Average frequency and volume of external funding sources over sample period

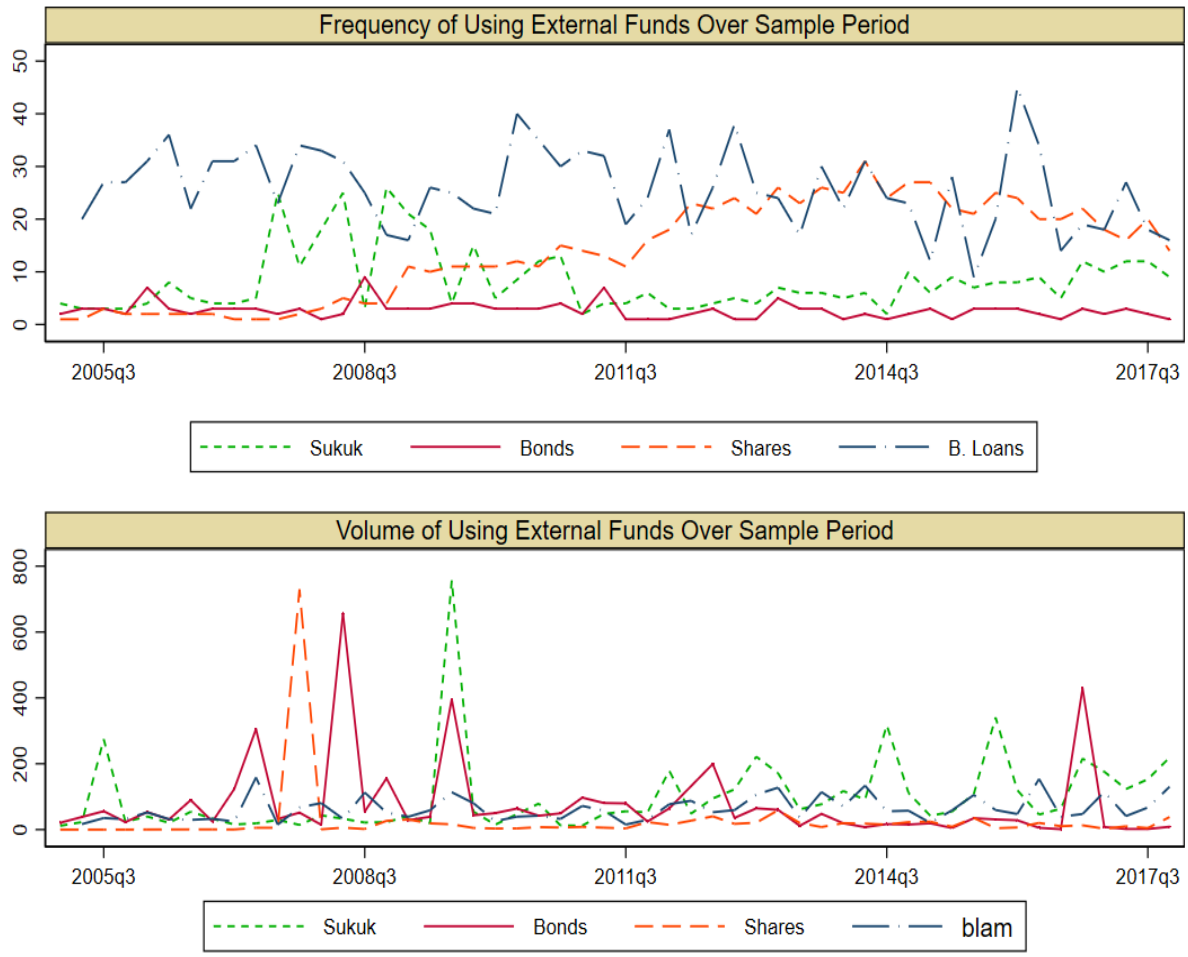


Figure III.5.: Frequency and volume external funding sources used by Malaysian firms over the period 2005–2017.

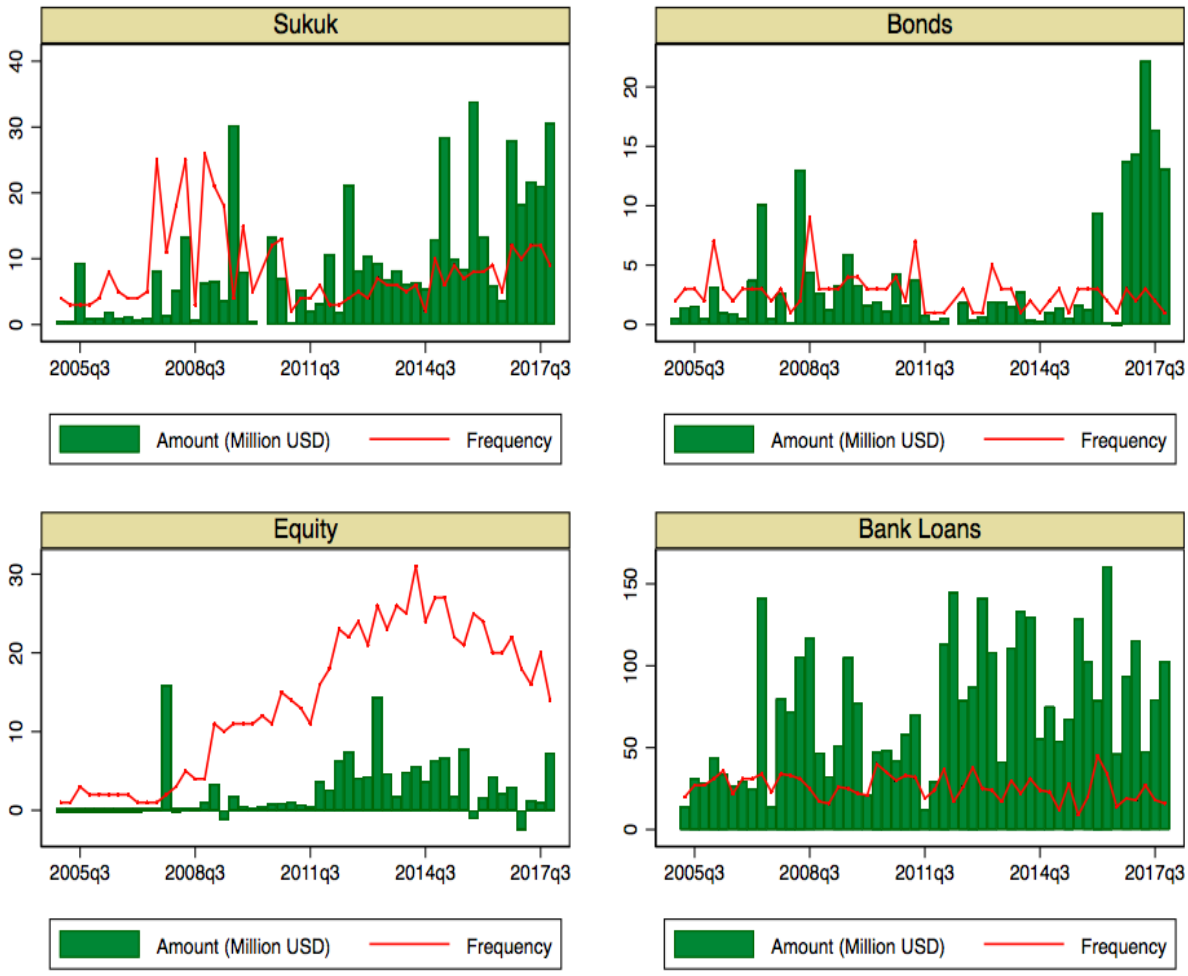
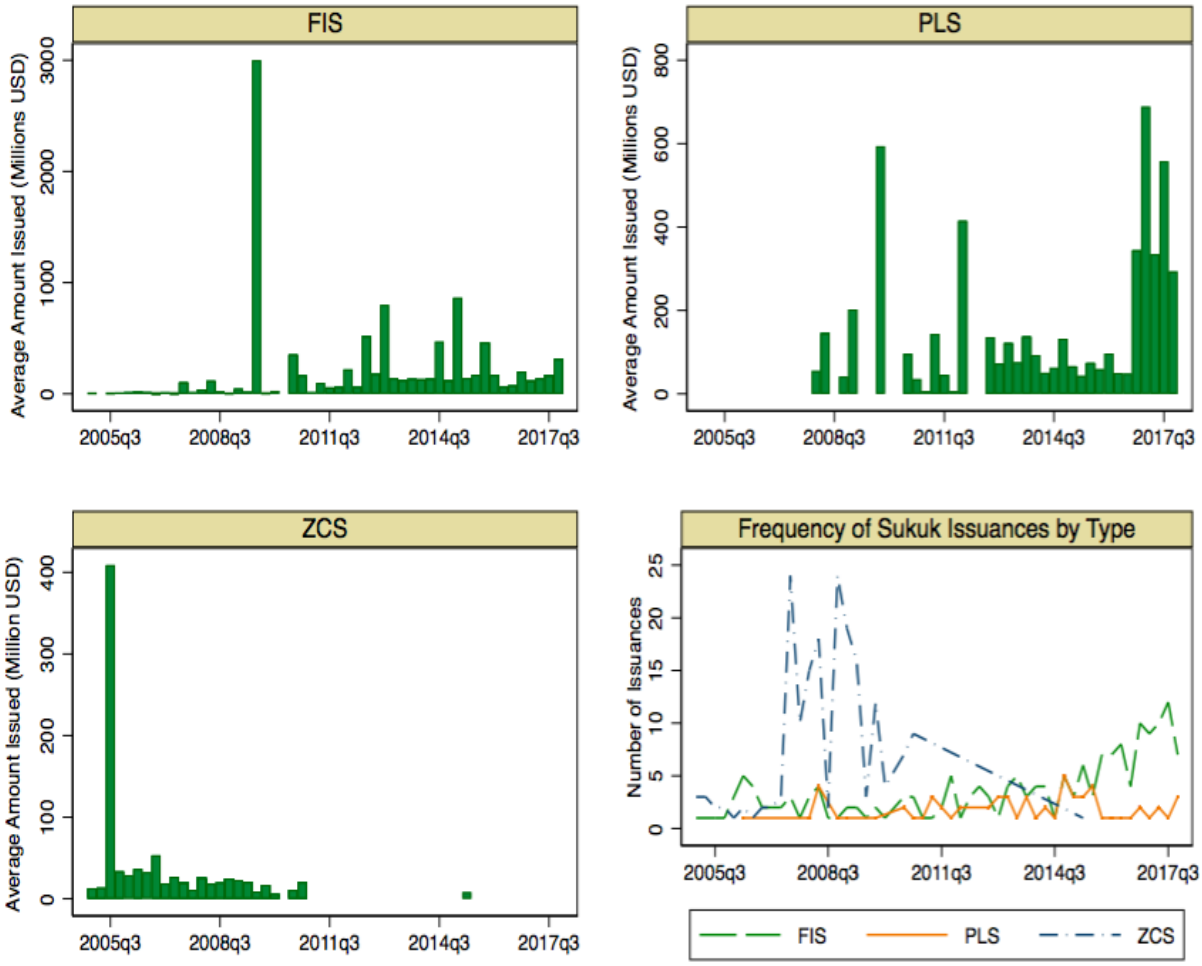
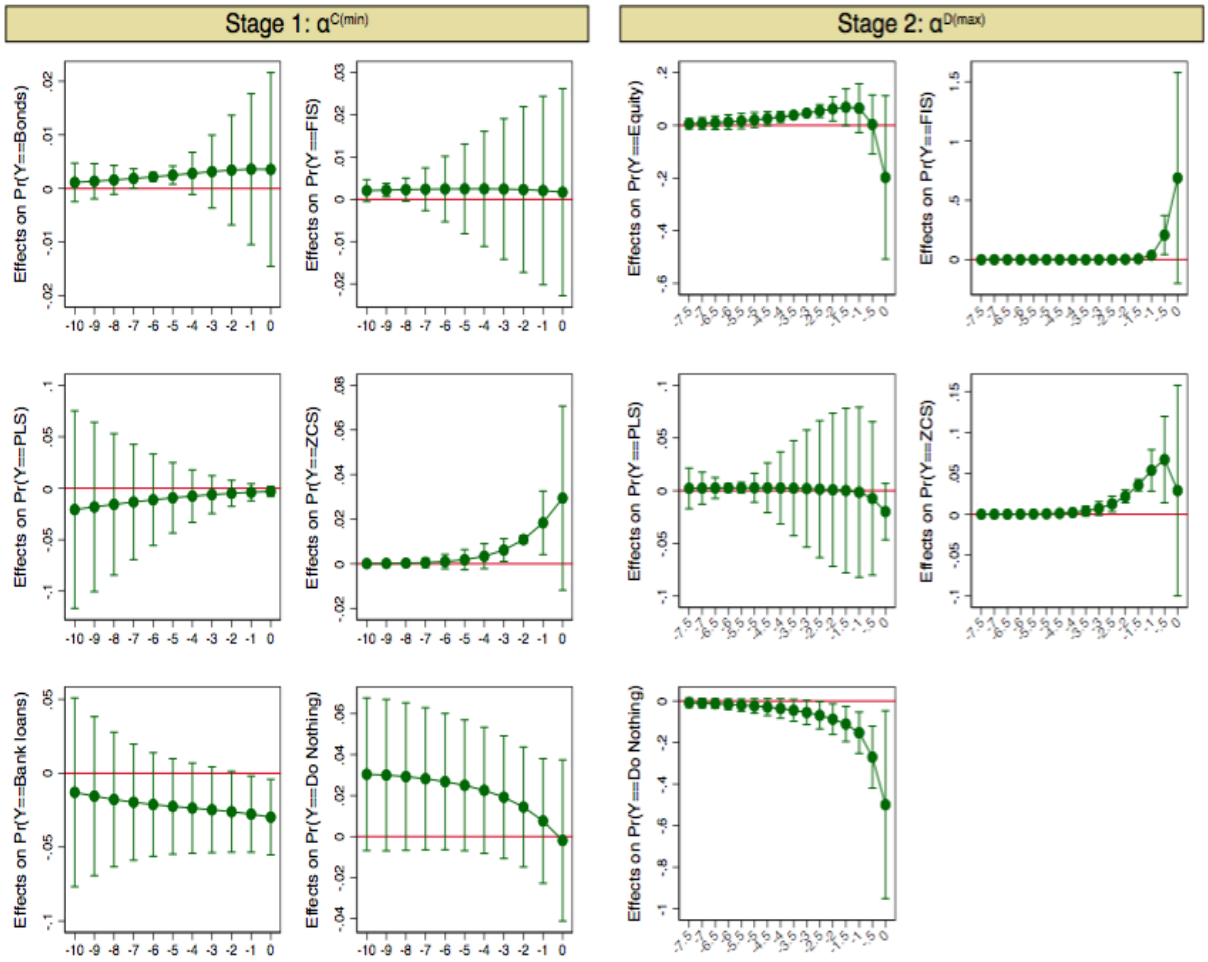


Figure III.6.: Average issuance frequency and volume of each sukuk type.



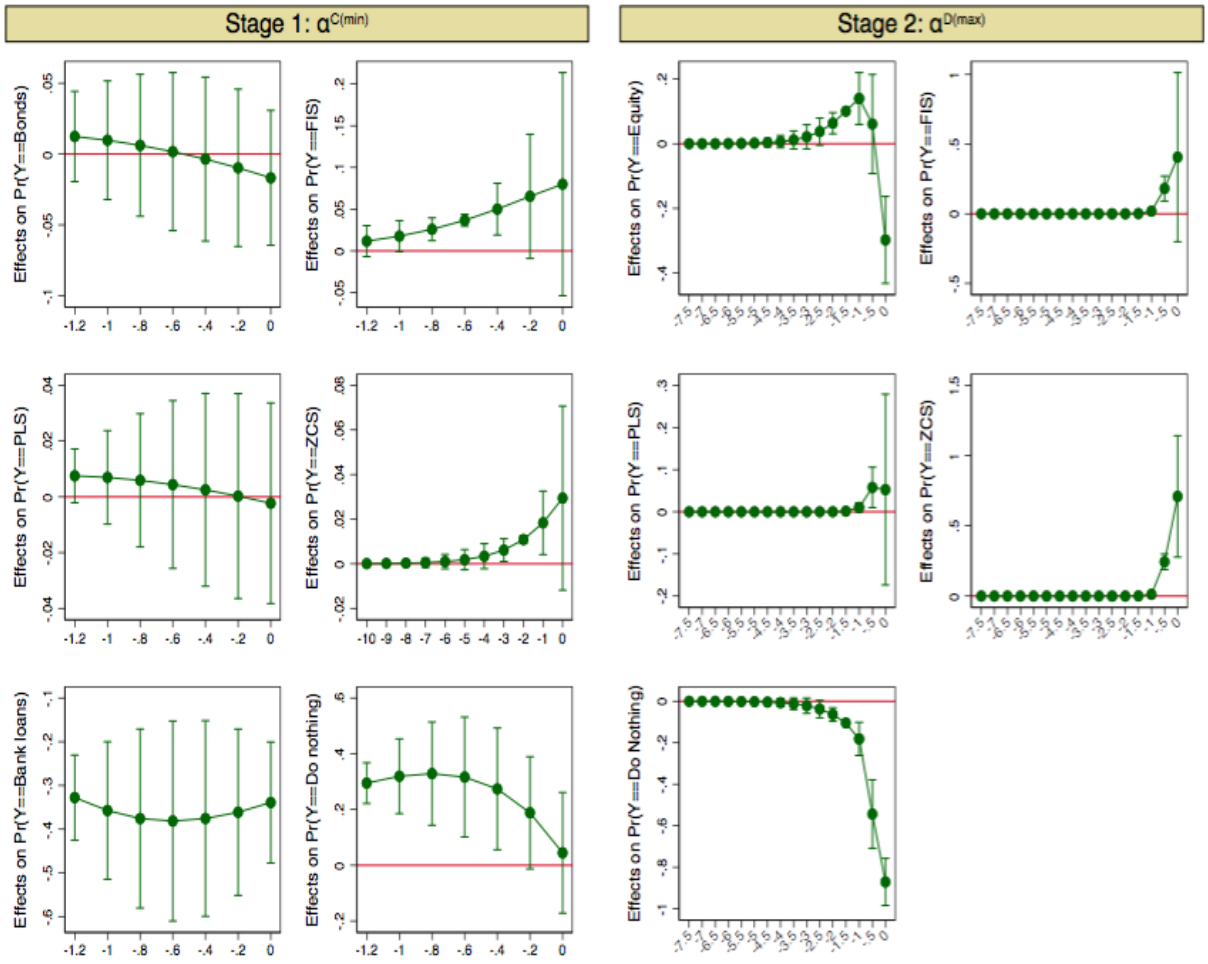
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.7.: Marginal effects of deficit in the semi-liberal pecking order theory.



$\alpha^{C(min)}$ = lower bound of savings, $\alpha^{D(max)}$ = upper bound of debt capacity , FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.8.: Marginal effects of deficit in the liberal pecking order theory.



$\alpha^{C(min)}$ = lower bound of savings, $\alpha^{D(max)}$ = upper bound of debt capacity , FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

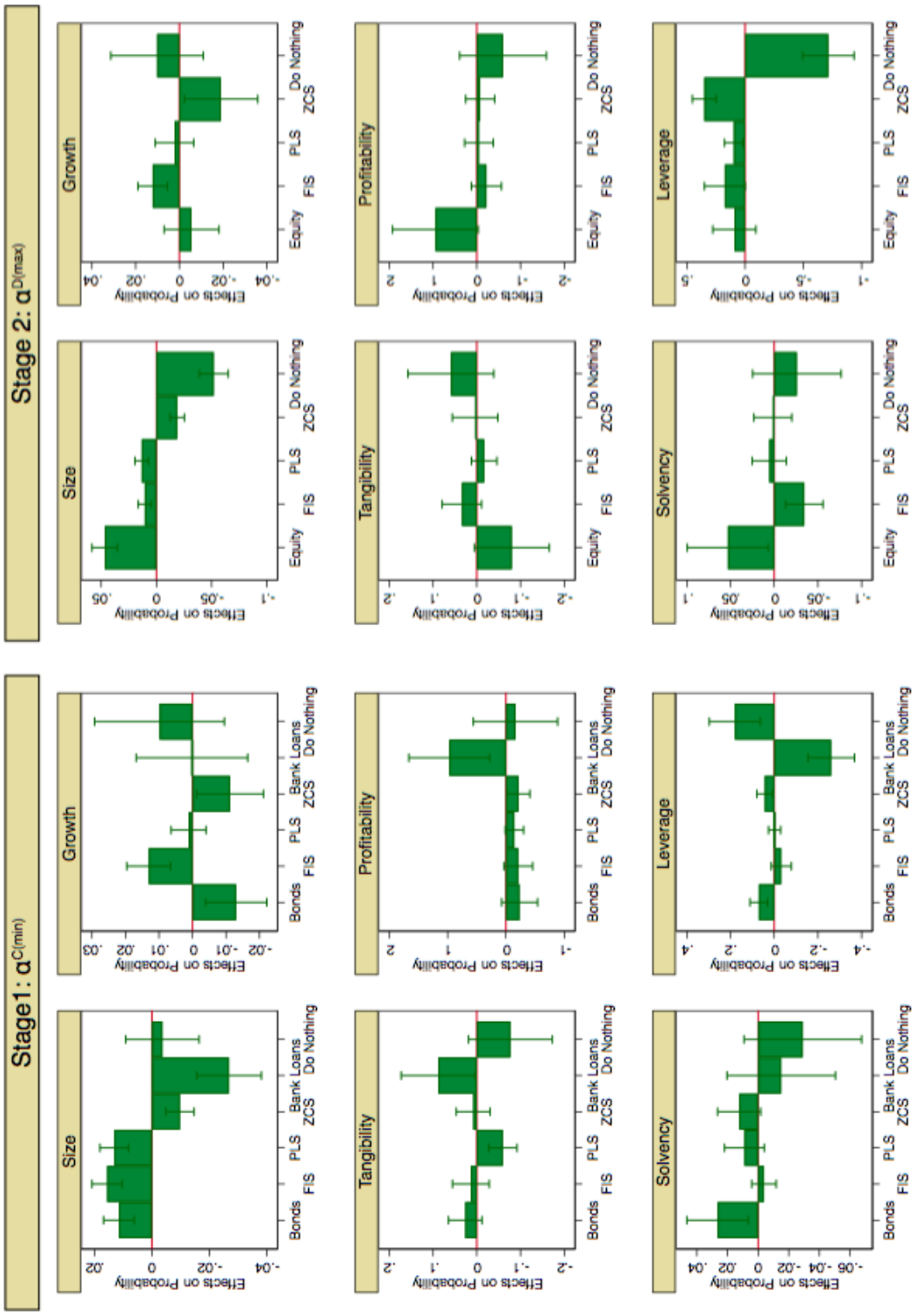
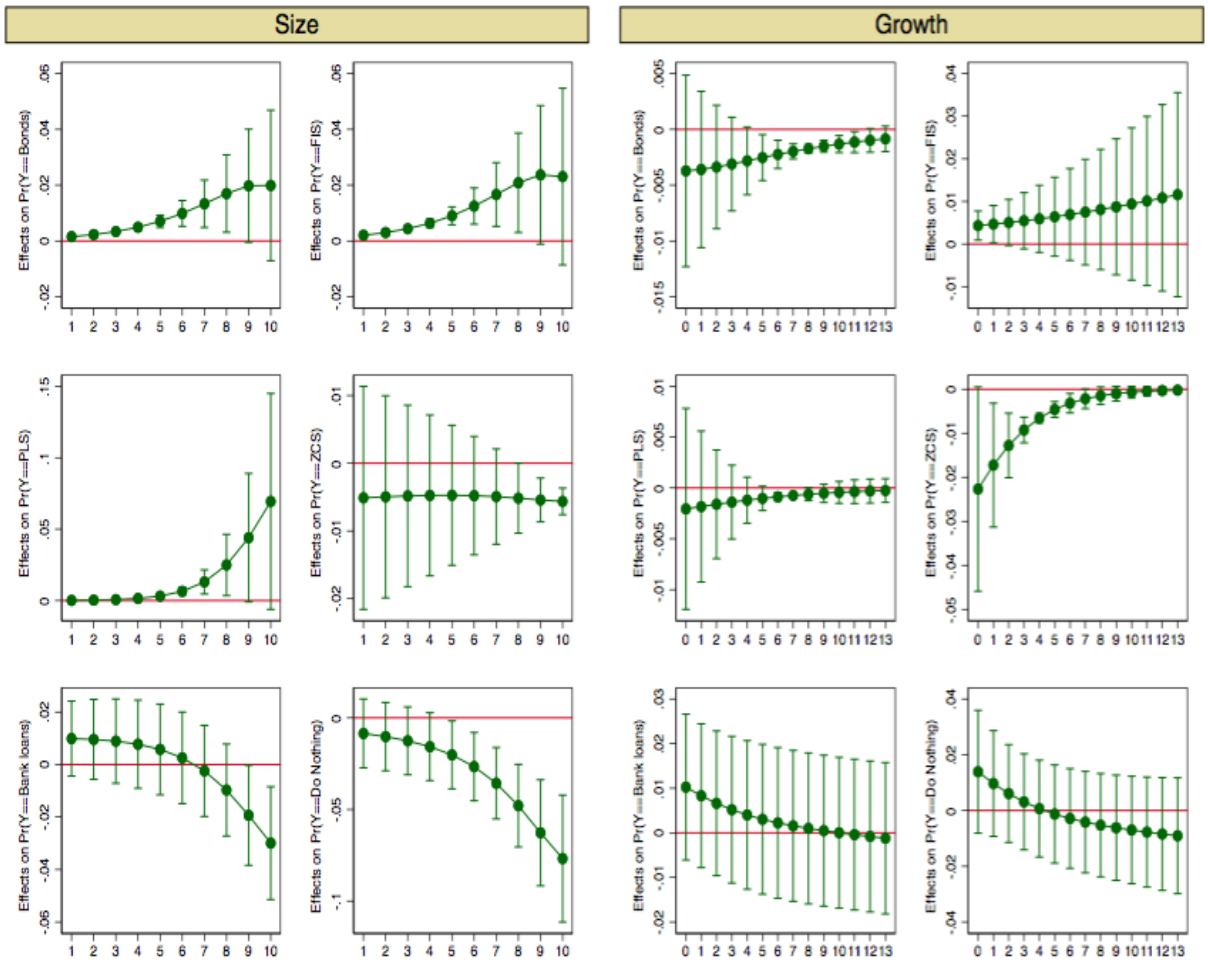


Figure III.9.: Average marginal effects of firm characteristics in the semi-liberal pecking order.

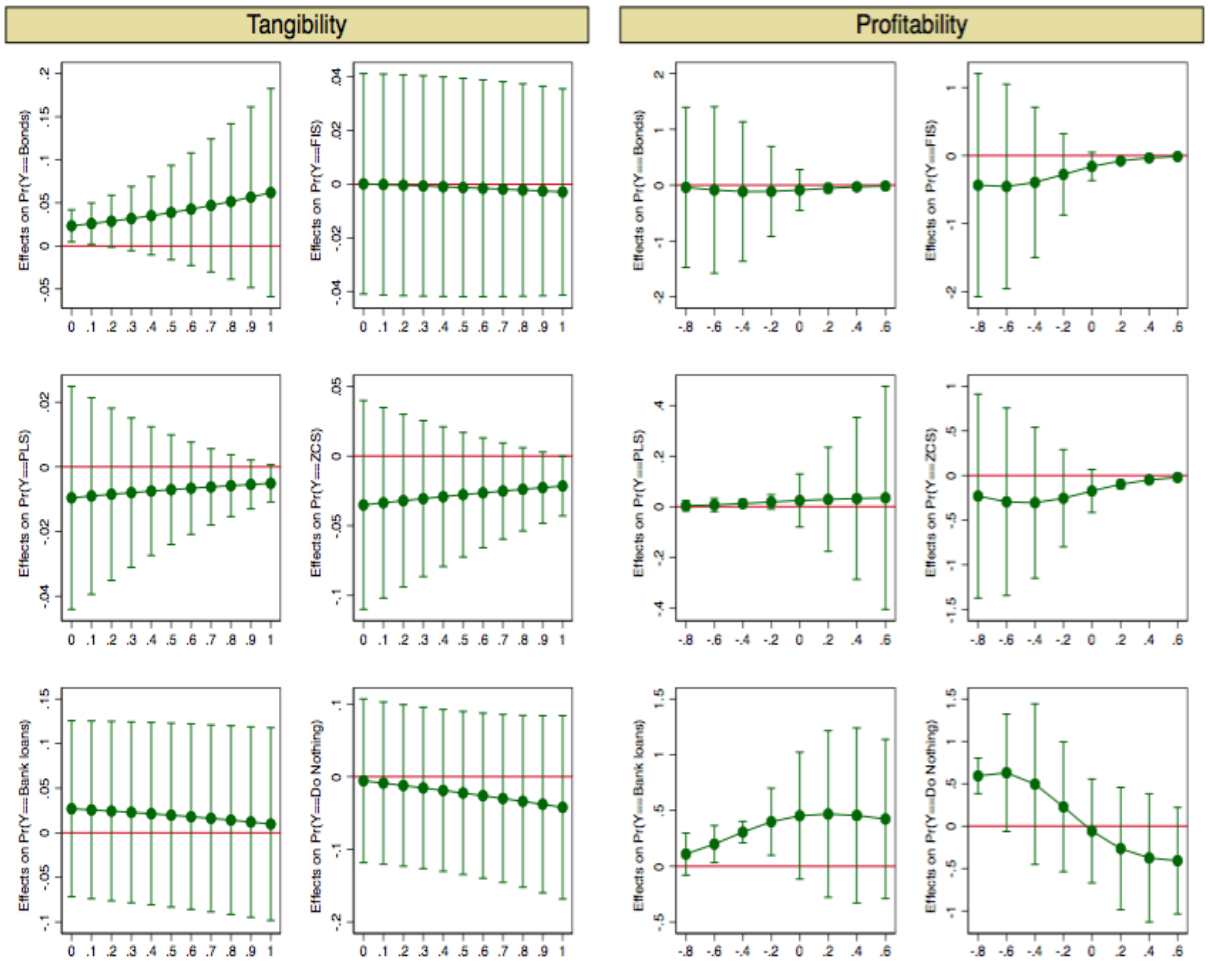
$\alpha^{C(min)}$ = lower bound of savings, $\alpha^{D(max)}$ = upper bound of debt capacity , FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.10.: Marginal effects of firm size and growth opportunities in the semi-liberal pecking order.



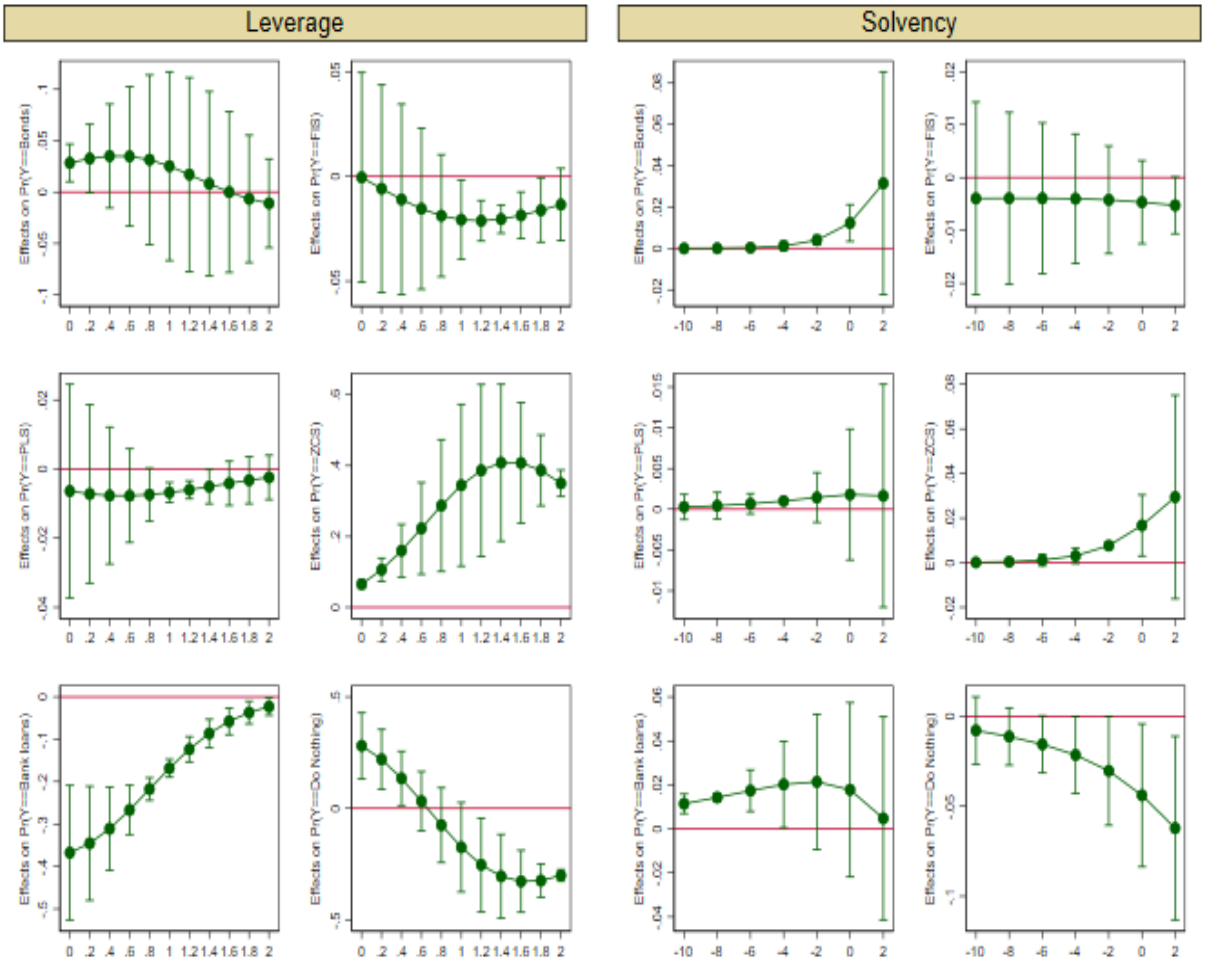
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.11.: Marginal effects of firm tangibility and profitability in the semi-liberal pecking order.



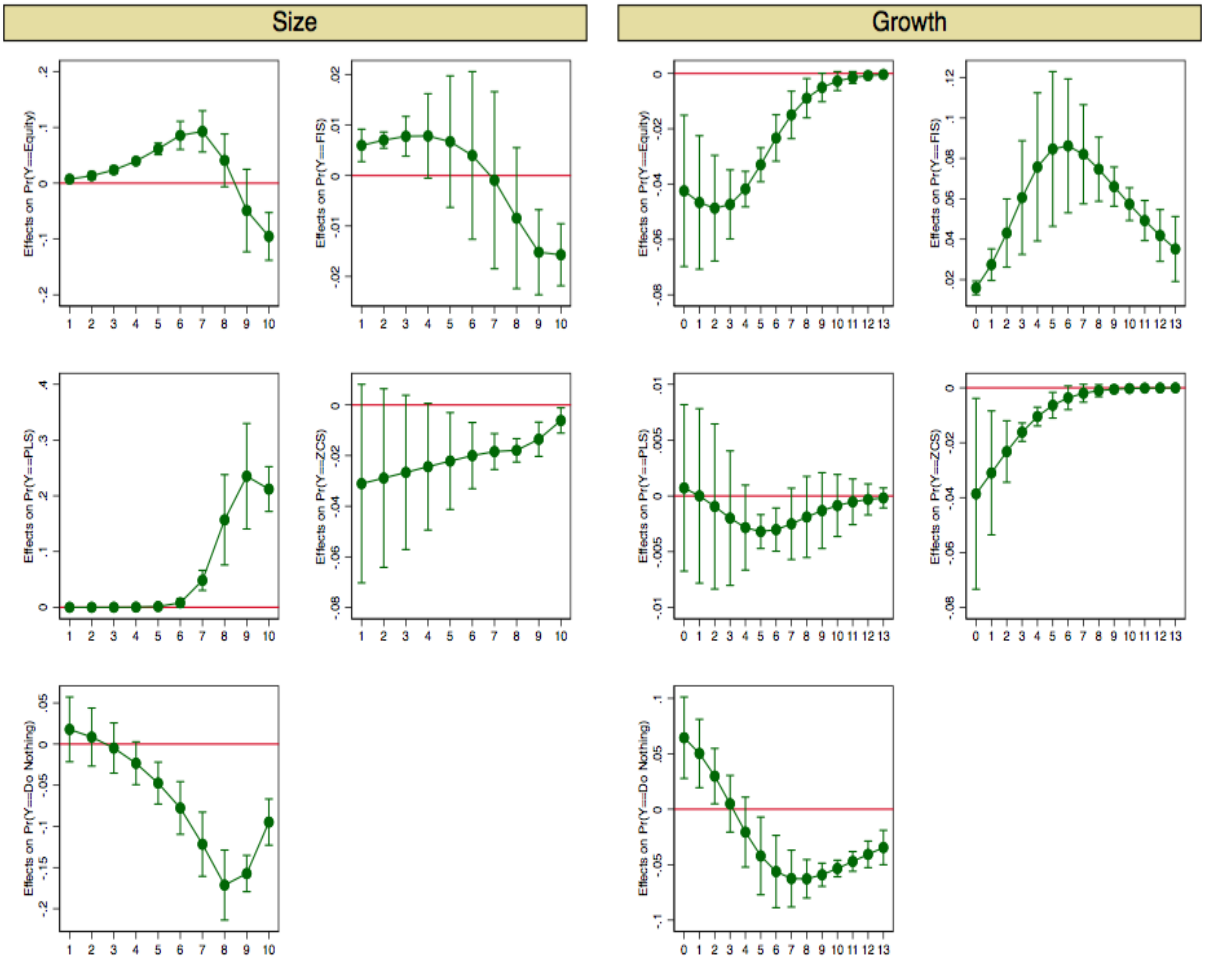
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.12.: Marginal effects of firm leverage and solvency in the semi-liberal pecking order.



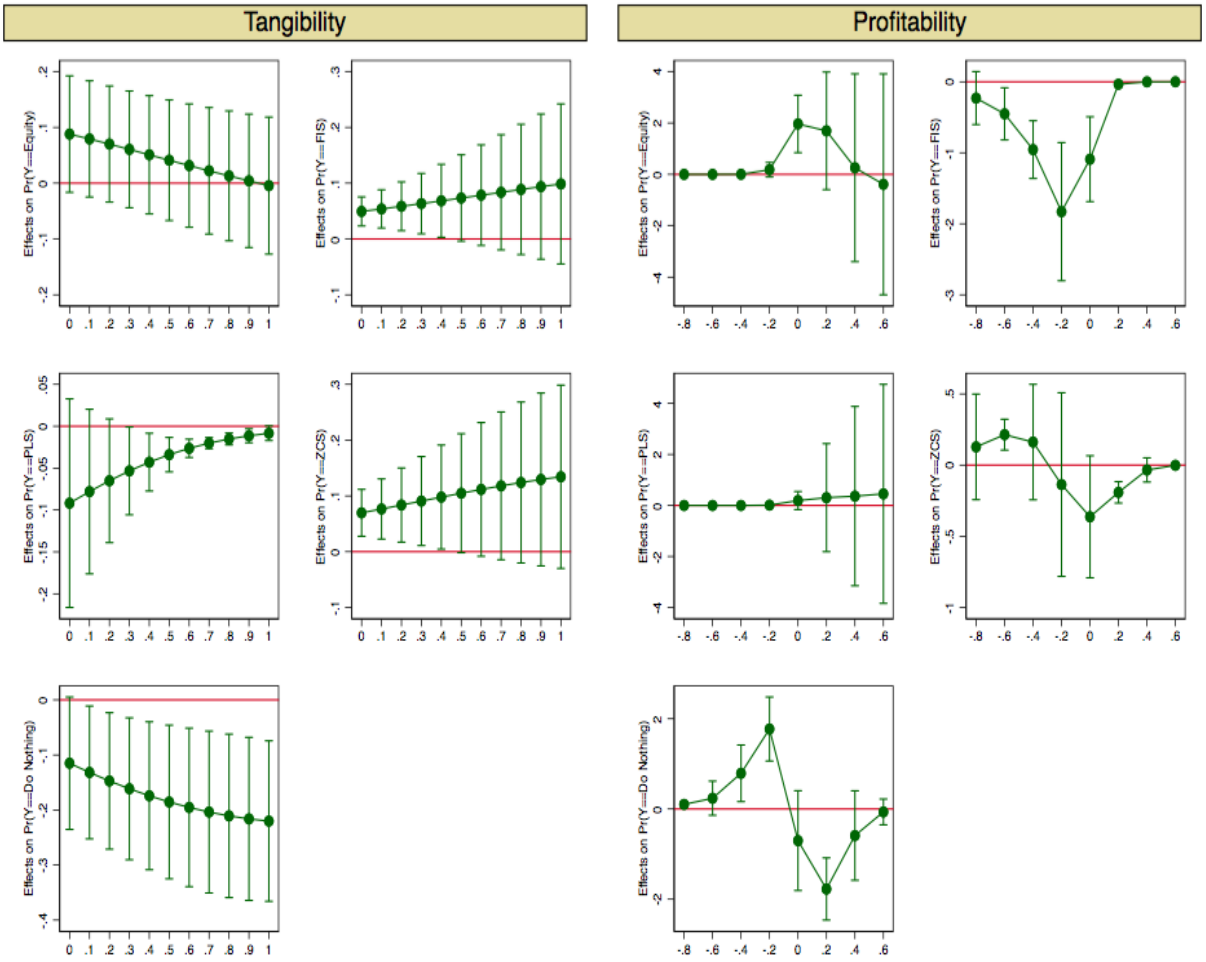
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.13.: Marginal effects of firm size and growth opportunities in the semi-liberal pecking order.



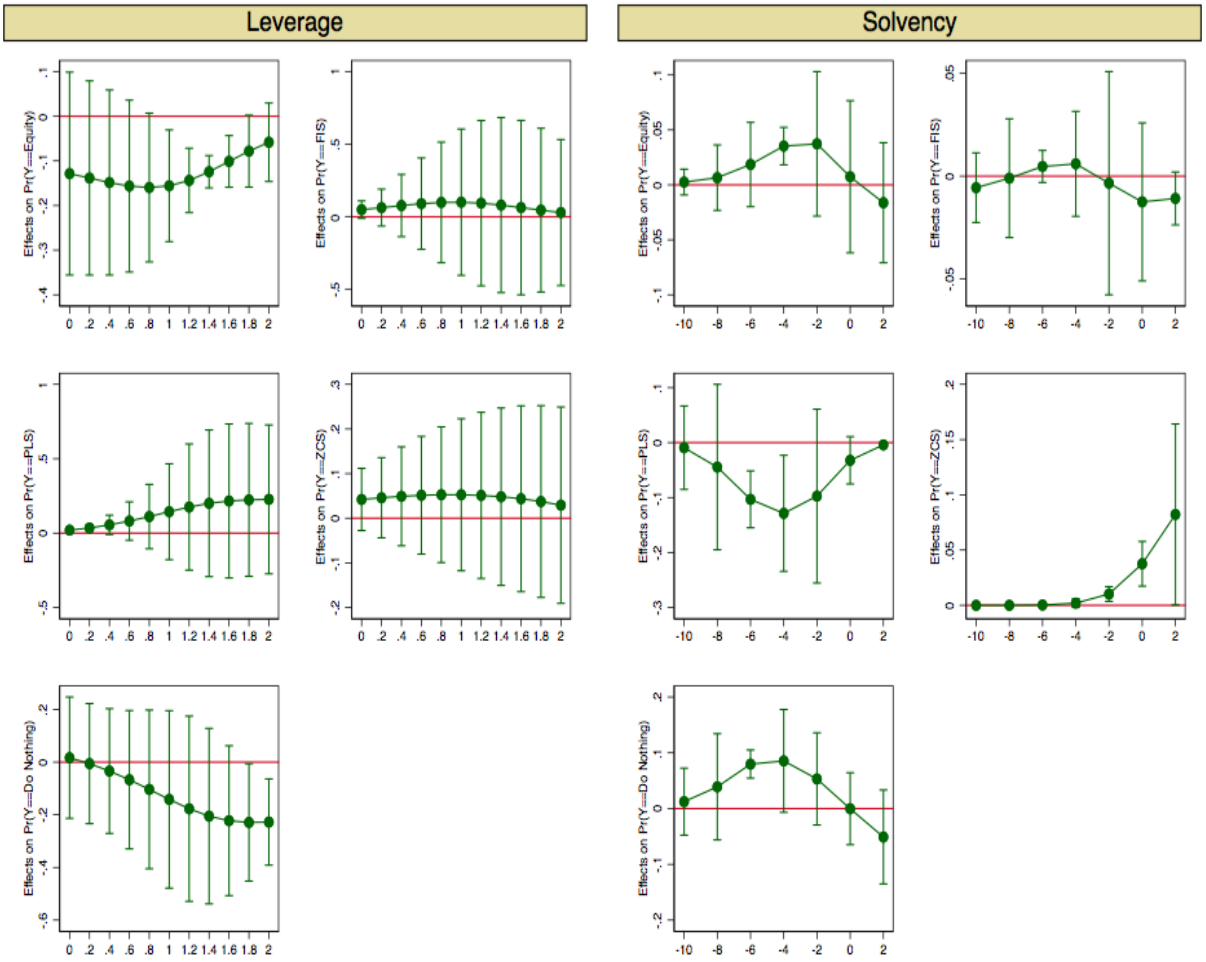
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.14.: Marginal effects of firm tangibility and profitability in the semi-liberal pecking order set.



FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.15.: Marginal effects of firm leverage and solvency in the semi-liberal pecking order.



FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

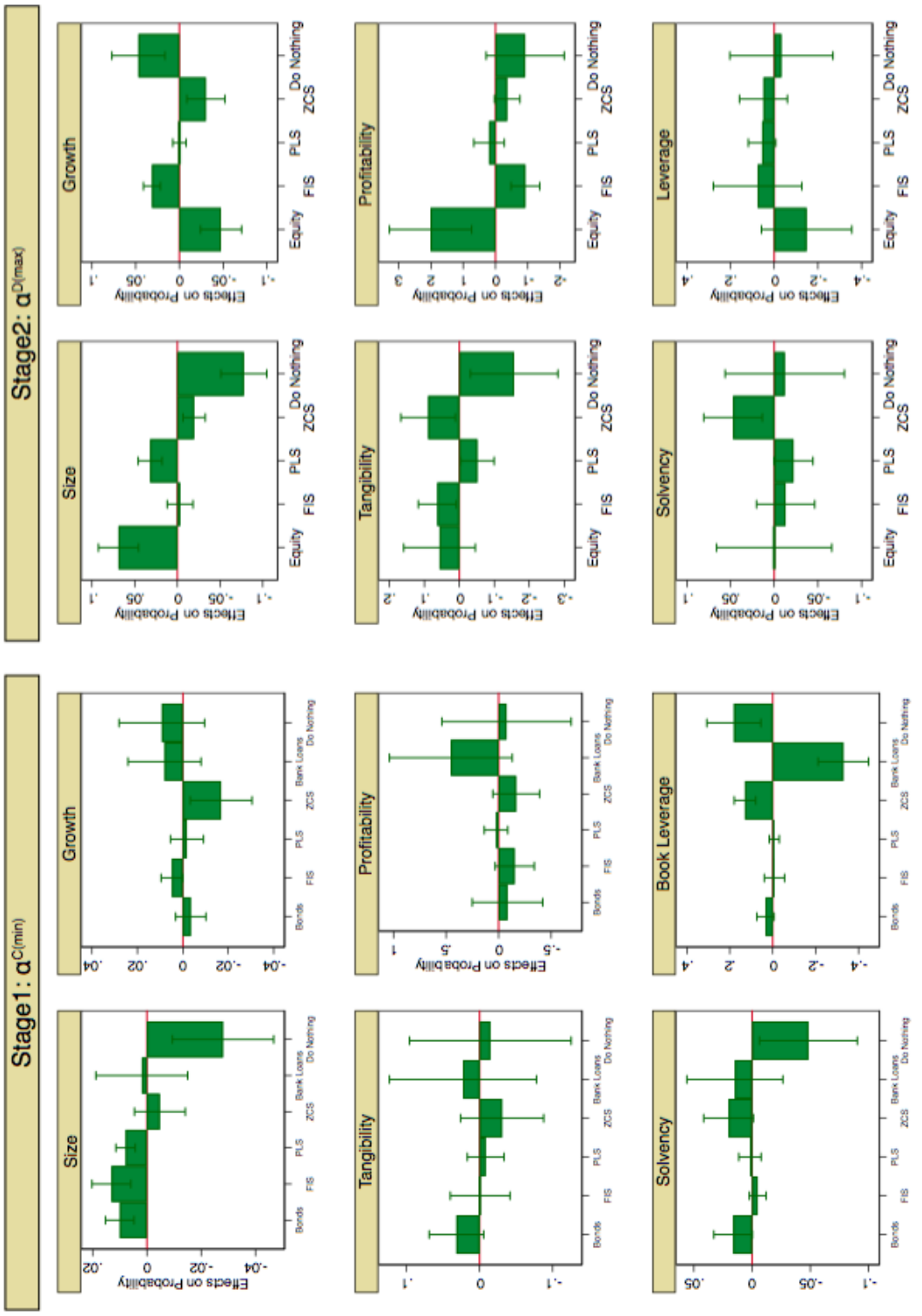
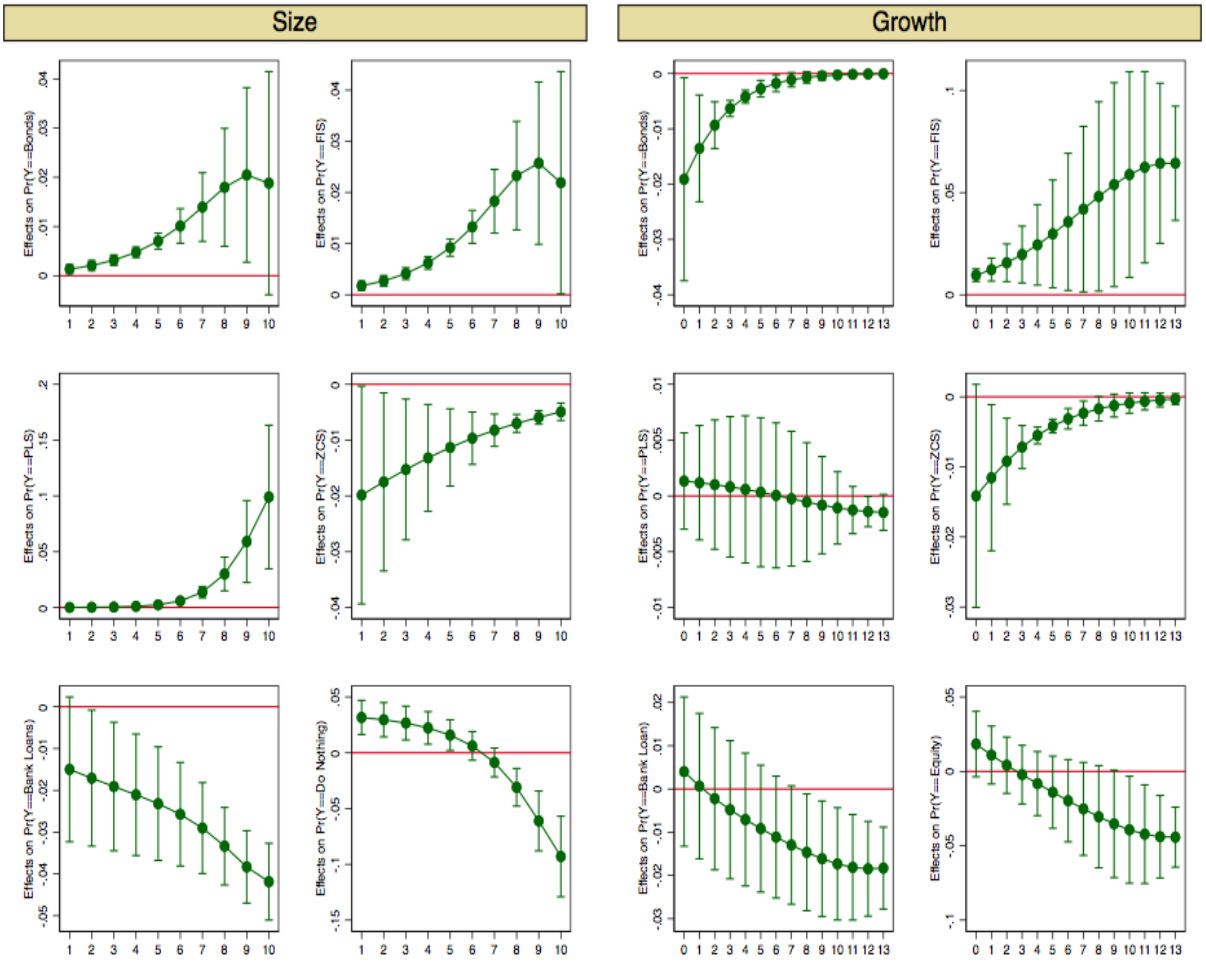


Figure III.16.: Average marginal effects of firm characteristics in the liberal pecking order.

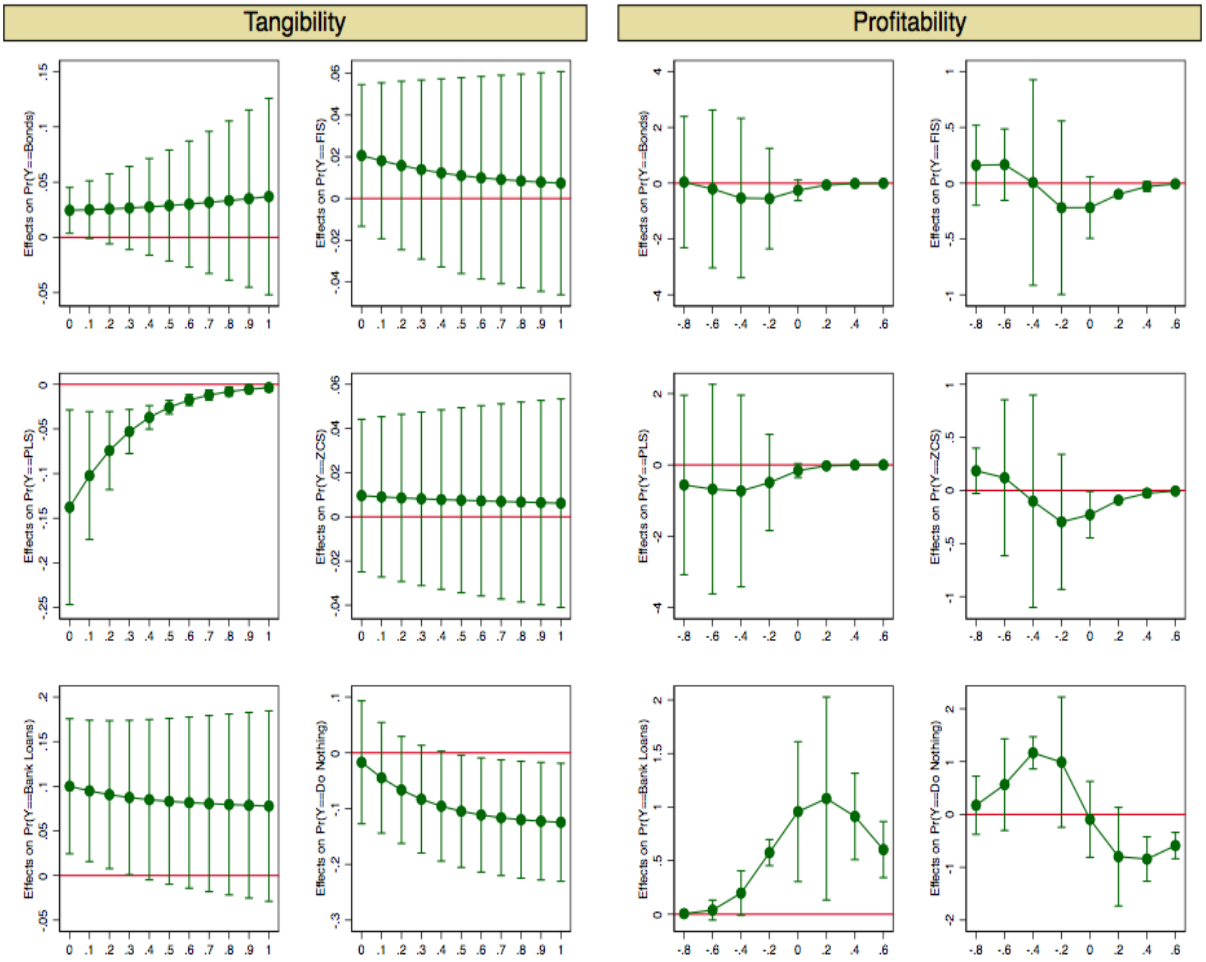
$\alpha^{C(min)}$ = lower bound of savings, $\alpha^{D(max)}$ = upper bound of debt capacity , FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.17.: Marginal effects of firm size and growth opportunities in the liberal pecking order.



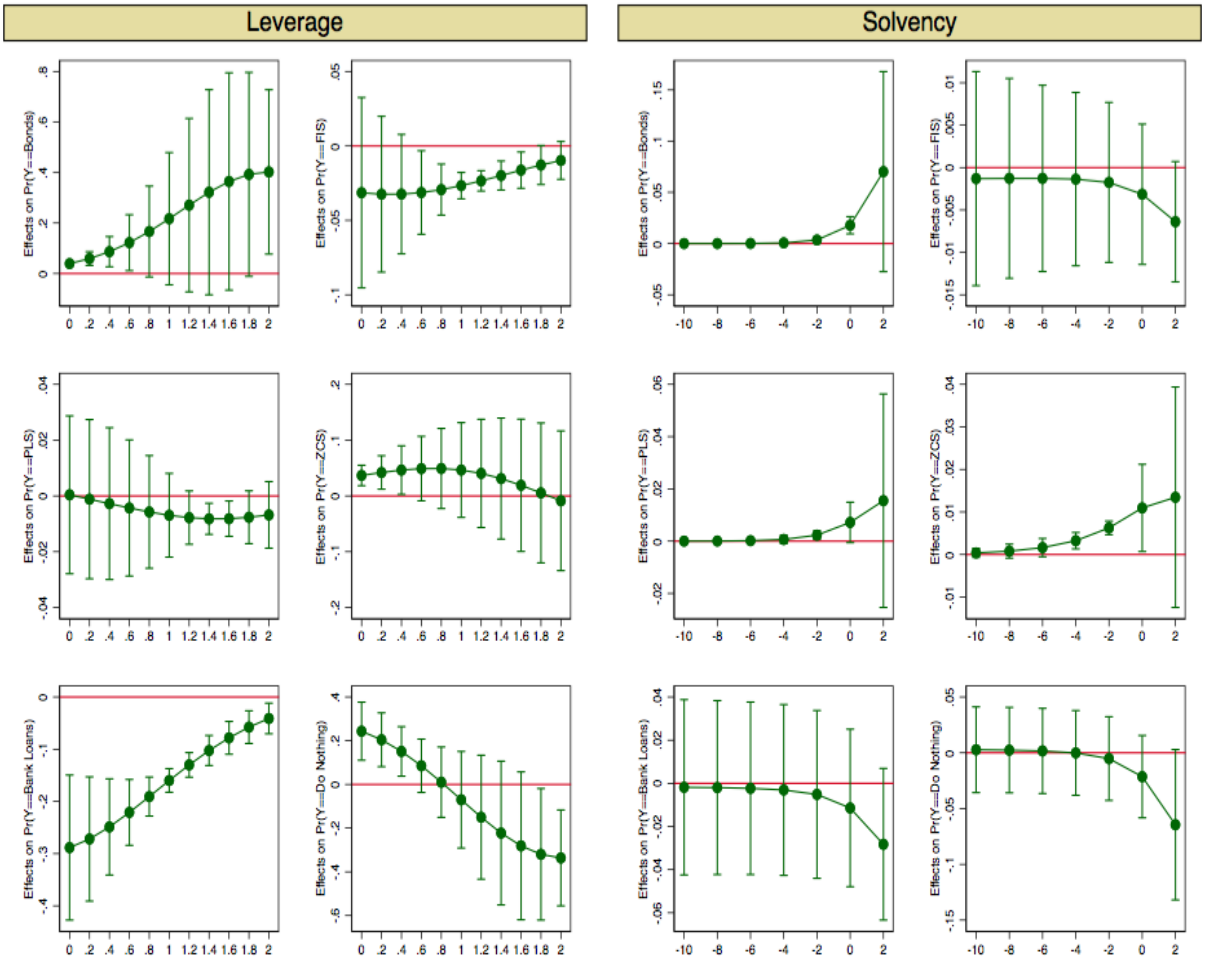
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.18.: Marginal effects of firm tangibility and profitability in the liberal pecking order.



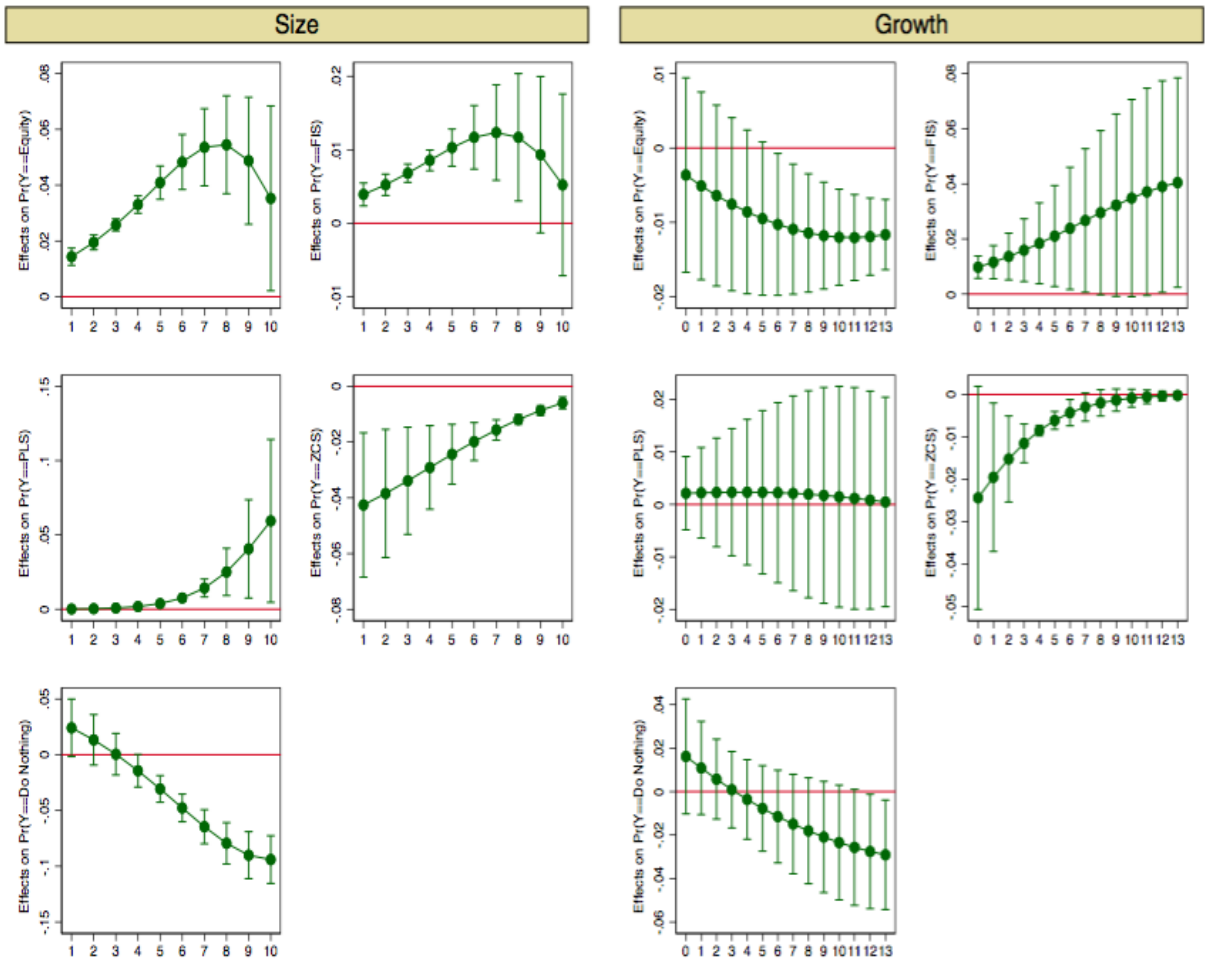
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.19.: Marginal effects of firm leverage and solvency in the liberal pecking order.



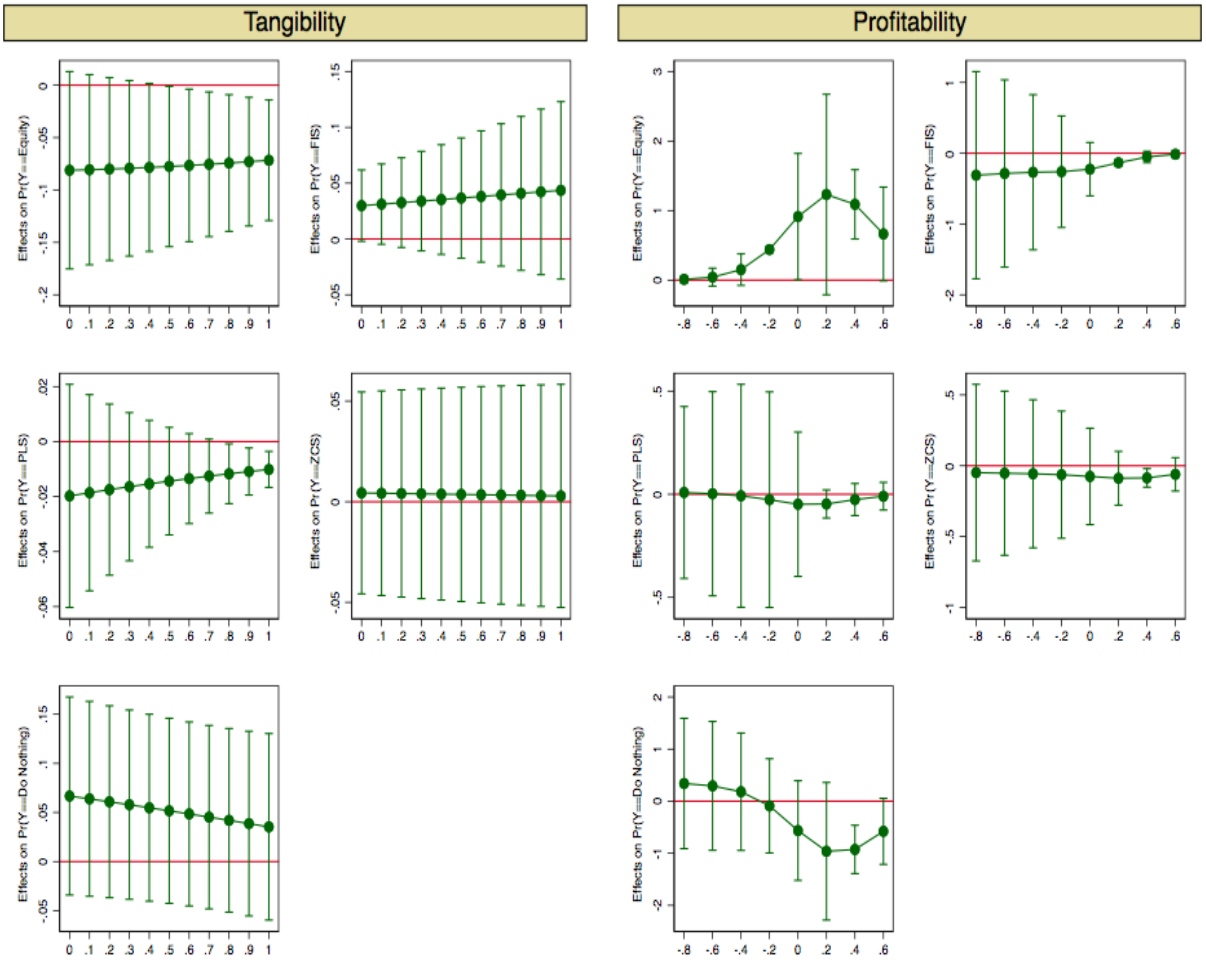
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.20.: Marginal effects of firm size and growth opportunities in the liberal pecking order.



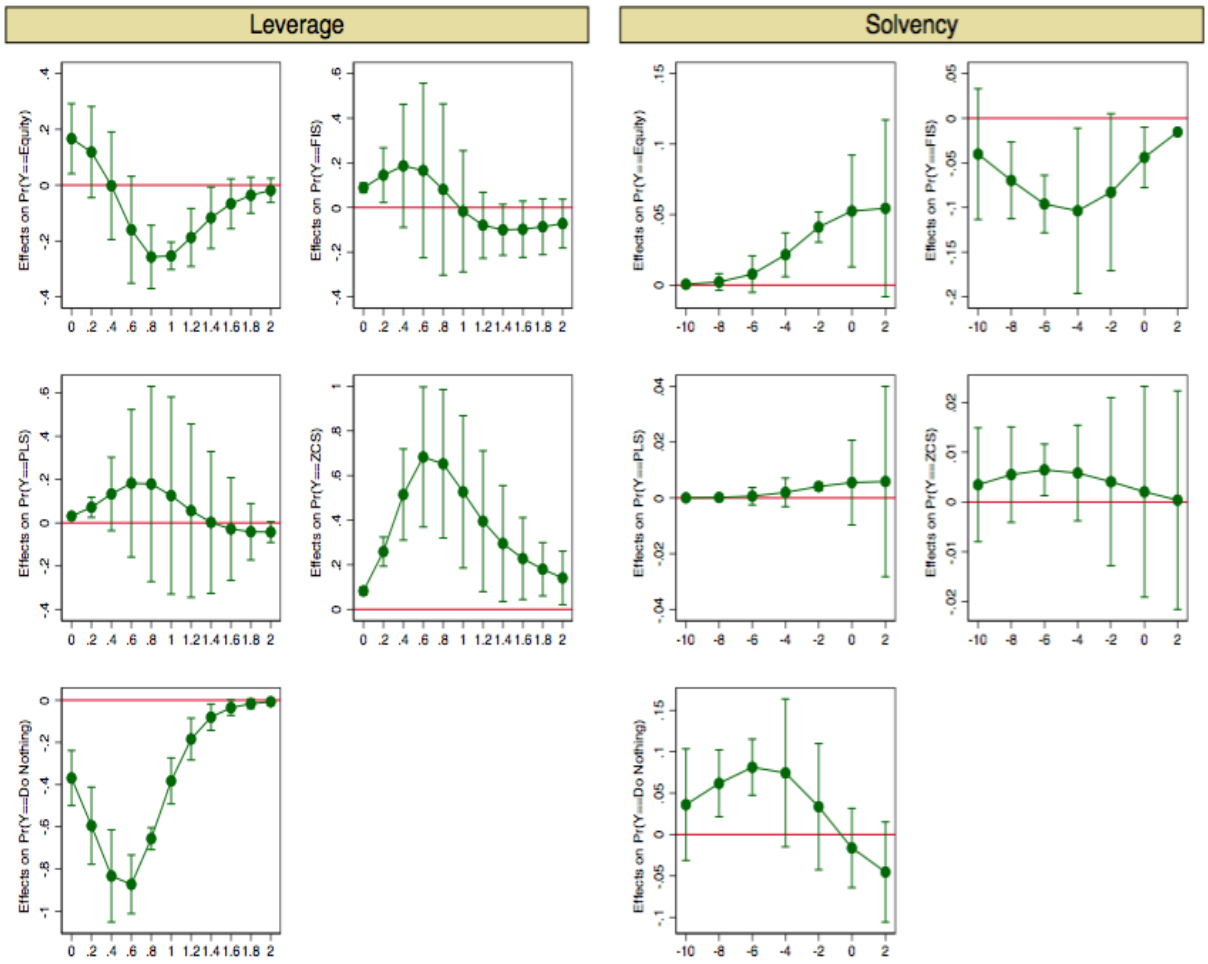
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.21.: Marginal effects of firm tangibility and profitability in the liberal pecking order.



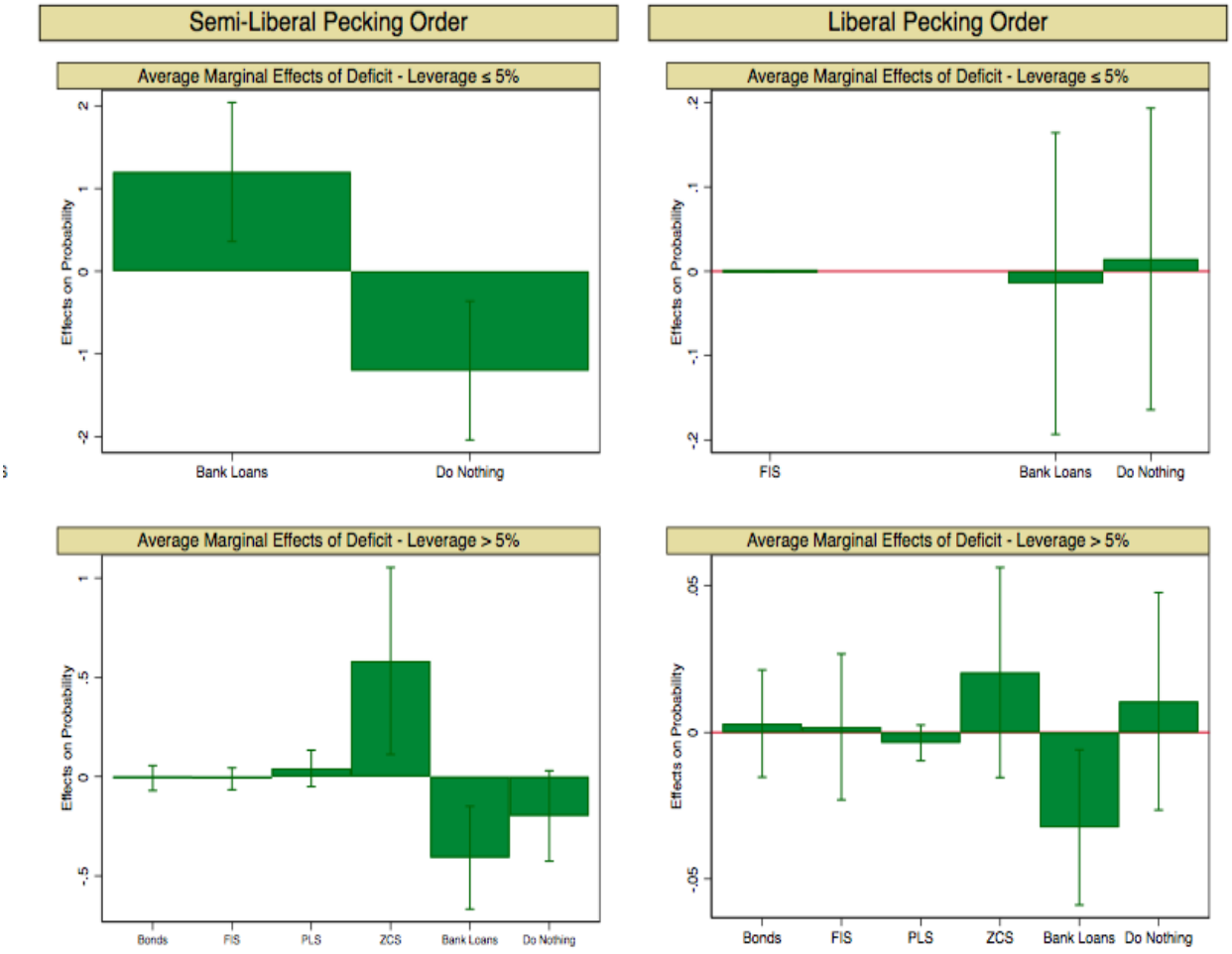
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.22.: Marginal effects of firm leverage and solvency in the liberal pecking order.



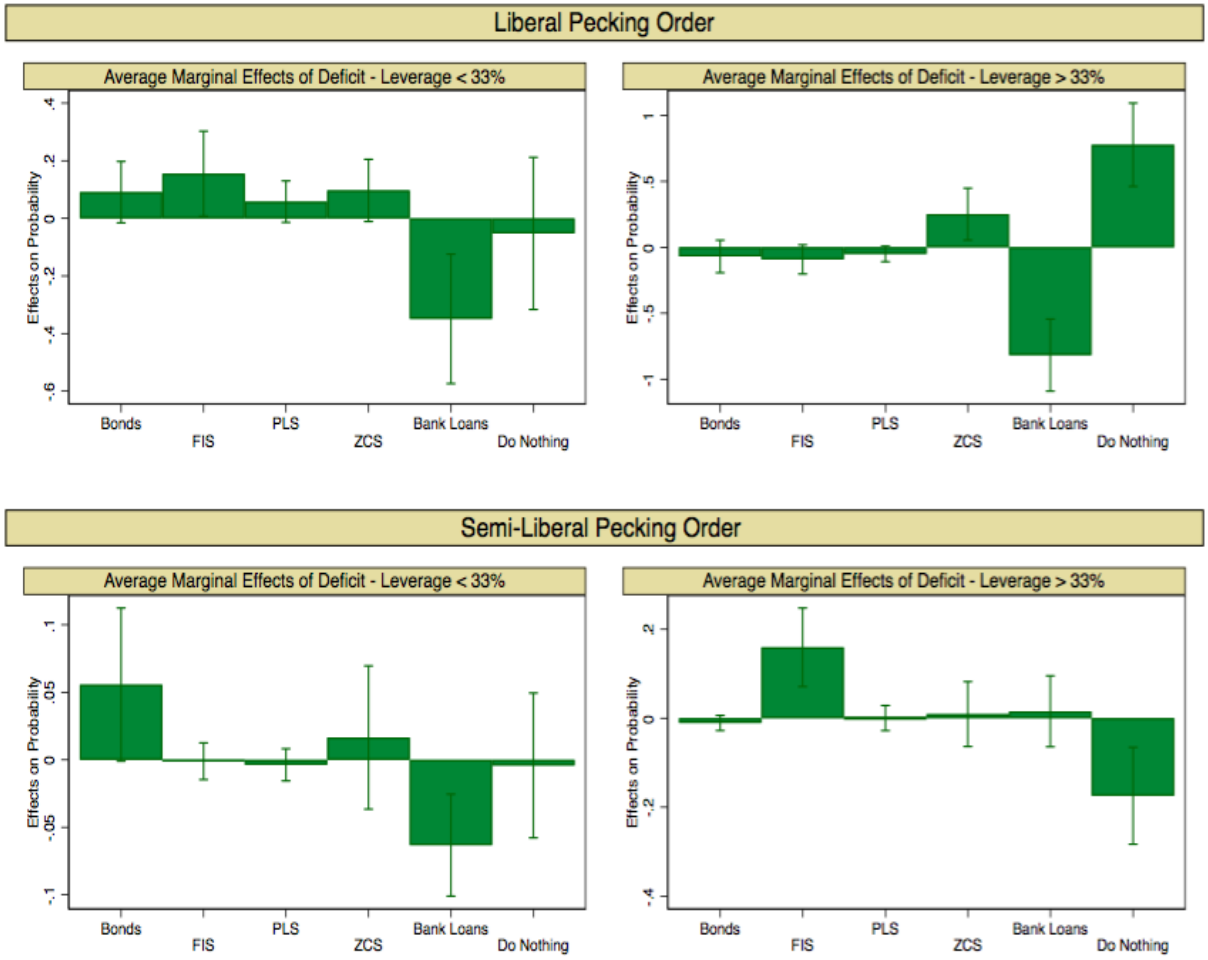
FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.23.: Marginal effects of deficit taking into consideration sharia compliance debt threshold of 5%.



FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Figure III.24.: Marginal effects of deficit taking into consideration sharia compliance debt threshold of 33%.



FIS = Fixed Income Sukuk, PLS = Profit-Loss-Sharing Sukuk, ZC = Zero-Coupon Sukuk

Chapter IV.

Islamic Banks Product Mix

Data scarcity is a critical issue in Islamic banking literature; major databases aggregate Islamic products under the "loans" category with no (Islamic) breakdown. Therefore, scholars are forced to analyze Islamic banks with an implicit assumption that Islamic financing facilities are equivalent to conventional loans. In this chapter, we hand-collect the quarterly values of the different Islamic banking products of 25 Islamic banks in the GCC. We examine Islamic banking products to answer the following questions: Do debt-like banking products dominate Islamic banks' assets, making them identical to conventional banks? Are bank performance and solvency sensitive to product's inclination to achieve the aspirations of Islamic law?What are the implications of such diversification/concentration on banks' financial stability and performance? Results show that debt-like products contribute to banks' returns but increase the default probabilities. Profit-loss sharing products are significant for banks' solvency. Asset portfolio diversification measures (Herfindahl Hirschman Index) and the Shannon Entropy (SE)) indicate that diversification into financing modes that are in the real spirit of Islam is beneficial to bank solvency but harms returns. In our analysis, we apply mixed models and Feasible Generalized Least Squares (FGLS) estimations.

Keywords: Islamic Banks, Product Mix, Portfolio Diversification, Performance, Middle East

I. Introduction

Banks represent more than 85% of the Islamic finance industry,[1] and most, if not all, countries adopting the system are bank-based. It is a key tool in their national income diversification policies. The sector gained more importance after the 2008 financial crisis when Islamic banks were found to be more resilient to debt-related shocks (Al-Khouri and Arouri, 2016; Alqahtani and Mayes, 2018; Grira et al., 2016; Khediri et al., 2015; Olson and Zoubi, 2017). Therefore, accurate assessment of the Islamic banking sector is vital as it is the core element of the Islamic finance system. In fact, much of the current literature on Islamic finance pays particular attention to banking; however, far too little attention has been paid to the product mix of Islamic banks (Hassan and Aliyu, 2018).

The products offered by Islamic financial institutions go beyond conventional loans and deposits. Sharia principles govern the business model of Islamic banks by prohibiting the charging and receiving of interest. In contrast to conventional banks, Islamic banks' liabilities cannot be specified for a fixed amount that is not related to the banks' portfolios performance. Also, instead of transferring risk to the borrower, Islamic intermediation calls for risk sharing through project-based financing. Therefore, Islamic banks provide intermediation via different channels, such as cost-plus sales, leases, partnerships and project financing schemes.[2] The facilities provided by Islamic banks vary in the degree to which they fulfil the aspirations of Sharia [3] law. Principally, partnerships and project financing (profit-loss sharing or PLS products) are the most preferred form of financing in the Islamic world because resources are combined, profits are not fixed, losses and returns are shared and the underlying project is economically "real". On the other hand, cost-plus sales and leases are comparable to conventional collateralized loans (debt-like). Hence, an ideal Islamic bank would offer more profit-loss sharing and less leasing and cost-plus selling. Islamic economists still debate product structures in an economic and religious context, establishing that PLS modes of financing achieve social justice, equality and economic growth because they represent the true spirit of Islam (Asutay, 2012).

The scarcity of data is a critical issue in the Islamic banking literature; major databases aggregate Islamic products under the "loans" category with no (Islamic) breakdown. Therefore, scholars are forced to analyse Islamic banks with an implicit assumption that Islamic financing facilities are equivalent to conventional loans. In that sense, studies consistently highlight the disparity between Islamic banking and the mainstream, while empirical evidence is incomplete due to data scarcity.

In this study, we use a novel dataset to investigate the product mix of Islamic banking. We examine the extent to which banking product fulfil Sharia aspirations affects Islamic banks' performance and stability. Also, we assess the asset portfolio diversification of Islamic banks. This chapter answers the following questions: Do debt-like banking products dominate Islamic banks' assets, making them identical to conventional banks? Are bank performance and sol-

[1] According to EY Islamic banking competitiveness report (Ernest & Young, 2016).
[2] Chapter I details the products of Islamic banking.
[3] Sharia is the collective Islamic teachings from the Quran and the sayings of the Prophet.

vency sensitive to the product's Sharia-compliance level?[4] What are the implications of such diversification/concentration on banks' financial stability and performance? We show that although debt-like products dominate Islamic banks' balance sheets, other Islamic products have distinct and significant effects on performance and solvency.

Our chapter provides new insights into Islamic banking literature by using a novel dataset that takes into account the unique features of Islamic banking facilities. The novelty of the dataset originate from the fact that the specific values of each Islamic banking product are not available in any professional financial database, other than banks' own annual reports and financial statements. Therefore, the studies investigating Islamic banks product mix are scarce. We manually extract the values of Islamic banking facilities such as Murabaha, Ijarah and Mudharaba from approximately 1200 financial report. Narayan and Phan (2019) stress upon the need for quality and unique datasets in Islamic banking and finance research.

We hand-collect the quarterly financial data of 25 banks operating in five Gulf Cooperation Council (GCC) Countries for the period from 2006 to 2016.[5] Our data allow us to investigate each banking product separately and observe Islamic banks' portfolio diversification via measures such as the Herfindahl Hirschman Index (HHI) and the Shannon Entropy (SE). We also examine the impact of individual products and portfolio diversification/concentration on banks' financial stability and performance. Our analysis is divided into two parts. In the first part, we assess the Islamic banking products autonomously, while in the second part we evaluate banks' asset portfolios.

A closer look at our data indicates that while debt-like products constitute a large share of Islamic assets, PLS facilities are gradually expanding (Tables IV.1, IV.3 and IV.6). Our data is collected from 25 GCC banks, where 42% of the global banking assets reside. The choice of banks depends on the accessibility and availability of quarterly financial statements. All banks in the GCC countries comply with the reporting and disclosure requirements recommended by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI); therefore, all banks articulate a breakdown of financing assets. Reported products include Murabaha, Ijarah, Wakalah, Musharakah, Mudharabah, Salam, Istisna' and sukuk.[2] However, for a more coherent assessment, we categorize the products into four groups based on contract specifications.

The first group include the most controversial Islamic banking products due to their resemblance to conventional loans; the contracts are Murabaha, Ijarah and Wakalah. The second

[4]In many places, throughout the chapter, we refer to the banking product degree of fulfilment of Sharia aspirations. It is vital to highlight that all Islamic banking products offered by banks comply with the Sharia law and are approved by designated Sharia committees and the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) which strictly revert to the Islamic Law. Throughout this chapter, the phrase degree of fulfilment of Sharia aspirations is akin to the extent to which Sharia aspirations and the representation of the spirit of Islamic economics are satisfied. According to the literature, participatory banking products (profit-loss-sharing) are preferred by Islamic economists because they represent the real spirit of Islam. However, debt-like products deviate for the Islamic aspirations inclining toward conventional banking practices. Nevertheless, both products are Sharia-compliant because they adhere to the Islamic principles.

[5]Gulf Cooperation Council countries included in the sample are Bahrain, Kuwait, Saudi Arabia, Qatar and the United Arab Emirates (UAE). Together, they host 68.2% of the total Islamic banking assets (Figure IV.4). GCC countries are dual financial systems economies. They devote substantial efforts to the infrastructure and development of Islamic banking and finance sector (Basu et al., 2015).

category embody Islamic scholars' most preferred financing modes because it matches financial intermediation with real projects through partnerships and venture financing; in this category, we include Musharakah and Mudharabah contracts. The uncertainty prohibition is slightly relaxed for the financial needs of sectors such as construction and agriculture, in which the final product is not available at the time of payment or transaction execution. Salam and Istisna contracts are specially designed to provide financing to the aforesaid projects and are more like conventional futures contracts; that is the third category. The final group is Islamic investment securities or sukuk. It is the only capital market tool in the Islamic banking industry and is extensively utilized by governments to finance infrastructure projects. Islamic banks are a major investor in sukuk securities because they serve as a liquidity management tool in addition to offering portfolio diversification benefits. To the best of our knowledge, research to date has not yet applied a comparable classification in empirical analyses. We use Fitch International Bank Database, S&P Global Market Intelligence and Gulfbase to verify hand-collected data and obtain additional bank data. Ultimately, our dataset is an unbalanced panel, with 5 countries, 25 banks and 40 periods.

In the first part of the chapter, we aim to investigate whether Islamic banks are dominated by debt-like products and how sensitive banks' performance and solvency are to the product Sharia-compliance level. According to Sharia principles, PLS facilities should be the core product of Islamic banks, and the limited empirical evidence shows the opposite is true. Aggarwal and Yousef (2000) theoretically demonstrate the essential role of PLS products. However, they also empirically illustrate that the utilization of PLS products is minimal compared to debt-like products in Sudan and Iran in the years 1994–1995. More recently, Khan (2010) and Chong and Liu (2009) make the same assertion for the years 2004–2005 and 2006 in Malaysia and the Middle East. These findings had scholars question how "Islamic" Islamic banks are. However, it is important to highlight that the previous analyses rely on a limited time frame to highlight a concrete conclusion about the banking activities of Islamic banks. The studies' outcomes are based on the historical comparison of the values of each product in each year. Other scholars use similar approaches to demonstrate the domination of debt-like financing in Islamic banks include Asutay (2007, 2012); El-Gamal (2006); Farooq and Zaheer (2015); Nagaoka (2007); Sairally (2002).

More frequently, the extant literature uses the theoretical structure of profit-loss sharing products to vindicate their modest utilization in Islamic ban(Abdul-Rahman et al., 2014; Abedifar et al., 2013; Azmat et al., 2015; Dar and Presley, 2000; Errico and Farahbaksh, 1998; Khan and Ahmed, 2001; Obaidullah, 2005; Sundararajan and Errico, 2002). They all agree that PLS products have a complex structure that can be a hindrance to regular transacting and require additional special risk management tools. Besides, banks face operational risk resulting from inadequate information disclosure. For example, in a Mudharabah[6] transaction where the client is the project manager, the bank is the fund provider and can only track the project performance through the client records. The moral hazard and adverse selection issues associated with

[6]Mudharabah is a profit-loss sharing product. It provides financing through a partnership agreement between the bank and the client. See Chapter I for details.

PLS products are highlighted by Abdul-Rahman et al. (2014); Abedifar et al. (2015); Azmat et al. (2015) as well. In a PLS transaction, the underlying asset cannot be used as collateral, and a profit-loss quota is established. A quota below the conventional interest rate increases withdrawal risks (Beck et al., 2013). Thus, the complex structure, demanding requirements and the competition between Islamic and conventional lead to the reluctance to offer PLS products. However, the extent to which banks are willing to accommodate PLS products in their portfolio has not been empirically examined. Our data demonstrate that on average, PLS represents 5% of total assets. It reaches 6% in the UAE and 13% in Saudi Arabia.

In light of the above, we start answering our questions by examining the change in asset composition over the sample period. The proportion of each banking product is presented by quarterly ratio of each product to total assets. We demonstrate that debt-like financing makes up the largest proportion over the entire period. Meanwhile, the ratio of PLS products to total assets is growing along with sukuk. Then, we assess the impact of each Islamic product on banks' performance and stability. We use the return on assets ratio (ROA) to measure bank performance, and the Z-score and risk-adjusted return on asset ratio (RAROA) to proxy for bank solvency. We estimate the effect of each banking product on banks' performance and solvency using a mixed-level model taking into account country and bank-specific variations. Our findings show that while debt-like products contribute to Islamic banks' profit, they are associated with higher default probabilities. Profit-loss sharing products have a negative relationship with bank insolvency. The findings indicate that a rational justification of the large proportion of debt-like products is its profitability. PLS products are not significantly profitable, but the participatory schemes and the "real" underlying project are viable factors to reduce the probability of bankruptcy. The latter is in line with Islamic banking advocates arguing that partnership financing schemes ensure closer monitoring and lower moral hazard, which reduces client default probabilities.

The unique dataset and the scope of the study allow us to extend our investigation to cover Islamic banks' portfolios, which we carry out in the second part of our chapter. We examine the extent to which asset portfolios in Islamic banks are concentrated and what the implications of such concentration (diversification) on banks' financial stability and performance are. As previously indicated, scholars (Aggarwal and Yousef, 2000; Asutay, 2007, 2012; Chong and Liu, 2009; Khan, 2010; Nagaoka, 2007; Sairally, 2002) claim that Islamic banks are identical to conventional banks due to the concentration of debt-like financing. Nevertheless, formal evaluation of portfolio concentration is limited to the work of Abuzayed et al. (2018); Ashraf, Ramady and Albinali (2016); Molyneux and Yip (2013) and Hassan and Grassa (2012). They look at the diversification of income structure in Islamic banks. They examine the role of financing income versus non-financing income. In all cases, the banking products associated with financing or non-financing income are not defined. They conclude that Islamic banks are concentrated in terms of financing income, which result in lower default probabilities.

Scholars attribute the concentration of debt-like financing in Islamic banks to the fact that they are prioritising profit maximisation over the socio-economic goals of Sharia. By focusing on debt-like products, banks can guarantee a large fraction of returns while bearing minimum risk. We

should underline that such transactions are still Sharia-compliant because they are asset-based. In the same vein, the large percentage of Murabaha and Ijarah products increase the correlation between conventional and Islamic banks' performance.[7] Thus, they bear the same types of risk against economic shocks. From another perspective, Ahmad (1993) argue that Islamic banks need more time to familiarize the audience with the new banking model and situate themselves alongside the conventional banking giant. Our aim in this chpter is to conduct a formal, in-depth examination of Islamic banks' asset portfolios and their corresponding effects on banks' performance and solvency. The conventional banking literature reports mixed evidence on the relationship between loan profile diversification and performance. While it is negative in the U.S. (Goddard et al., 2008) and Europe (Lepetit et al., 2008), Rossi et al. (2009) find it is positive for Austrian banks. Our chapter is the first to explore the issue in Islamic banks.

We adopt the conventional banking literature to examine Islamic banks' asset composition. More recently, scholars have been interested in the diversification implications of the combination of lending and noninterest-bearing activities. We focus on the asset and lending technology diversification because we follow a similar approach. Banks' product-mix restructuring and the introduction of new lines such as investment banking is a result of market competition (Lepetit et al., 2008). The argument applies to Islamic banks that are competing with conventional banks. They strive to attract Muslim and non-Muslim clients while maintaining Sharia-compliant status. De Haas et al. (2010) and Berger and Black (2011) examine loan portfolios by breakingdown loans according to the customer type and lending technology. This results in categories such as mortgage lending, household lending, state-owned enterprise loans, asset-based lending and transaction-based lending.

We follow the same logic to disaggregate Islamic banks' banking products based on the underlying contract, which results in four categories: debt-like, profit-loss sharing, futures-like and the investment (sukuk) products we specified earlier. We assume that Islamic banks hold a portfolio of assets with different degrees of Sharia aspirations achievement. Then, we measure banks' asset portfolio diversification by computing the Hirschman-Herfindahl Index and the Shannon Entropy for each bank in every quarter during the sample period. We find that portfolio diversification varies over time and across countries. On average, diversification was the highest before the 2008 financial crisis. We underline a second phase of diversification in the period between 2011 and 2016. Thus, we reject the claim of absolute concentration (with debt-like products) in Islamic banks. In the final stage of our analysis, we examine the effect of portfolio diversification/concentration on banks' solvency and performance. We do that by applying Feasible Generalized Least Squares (FGLS) estimations to control for serial correlation and heterogeneity. Our estimation output highlights that concentrated portfolios (with more debt-like products) are more profitable; however, these are borne to a higher risk of default. Therefore, diversification into more Sharia-compliant products is beneficial to bank solvency but harms returns.

[7] Murabaha and Ijarah are the most popular debt-like Islamic products. Murabaha is financing based on cost-plus sales, while Ijarah is based on a lease arrangement. More details are given in Chapter I.

In conclusion, using a new-found dataset, our chapter does not reject the claim that (by value) debt-like products are dominating the assets of Islamic banks. However, we highlight that the share of the preferred Islamic financing modes, such as PLS financing and sukuk, is increasing. The latter ensure solvency while the former generates more returns. We conform to the view that Islamic banks resort to debt-like products to secure their position within the mainstream system. The system has been going through a transition phase where it needs to familiarize the audience with its new intermediation model (Ahmad, 1993). Our results suggest that Islamic banks are not as concentrated as argued. At the same time, we cannot claim that Islamic banks are fully Sharia-complaint. We highlight reasons for scholars to incorporate the conceptual features of Islamic banks into empirical studies. We argue that conventional evaluation approaches are not necessarily applicable to Islamic banks.

The remainder of the chapter proceeds as follows. Section 2 provides a brief background on Islamic banking in the GCC countries. Section 3 offers a literature review on Islamic banking theory and practice, as well as portfolio diversification. We present our hypothesis in Section 3, and in Section 4 we describe our data. We explain the econometric approach in Section 5. In Sections 6 and 7, we present our results and discussion, respectively. Section 8 includes robustness checks. Finally, Section 9 concludes the chapter.

II. Islamic Banks in the GCC Countries

The banking sector is key to the Gulf Cooperation Council countries, as in all other emerging economies. The financial system in such countries is banking-based with underdeveloped financial markets. Hence, the soundness of the banking system is strongly linked to economic stability and economic equality (Bekaert and Harvey, 2002; King and Levine, 1993; Sanya and Wolfe, 2011). In the past two decades, GCC countries began the implementation of strategic economic reforms to diversify national income away from energy and oil. This is a response to plummeting oil prices and the political and economic liberalisation movement in the region. For instance, the Gulf states initiated reforms to attract foreign direct investments (FDI) not only in the energy sector but in civil aviation, communication and tourism as well. They also privatized sectors such as utilities and education (Teitelbaum, 2009).

The financial sector is a key part of the diversification plan and it is the second-largest contributor to the national GDP. The sector is dominated by banks which are the main providers of funds and hold large value of government securities. Moreover, banks' stocks dominate the stock markets. All six nations host dual financial systems where Islamic and conventional banks operate in parallel and are pursuing similar government policies to adopt Islamic banking in the system. Banks are also the most regulated financial institutions in the MENA region. Banks in the GCC make an interesting sample for our study because the six states host 68.2% of the Islamic banking assets (Figure IV.4). In 2014, the GCC's contribution to the growth of the Islamic banking sector was approximately 69%. According to the Islamic Financial Services Industry Stability report Islamic Financial Services Board (2018), the Islamic banking sector was able to maintain growth rates in the UAE and Oman despite the economic turmoil the region is facing.

As mentioned earlier, Islamic banking is based on the Islamic teachings extracted from the Quran and Hadith.[8] The interpretation of the teachings is homogeneous across the GCC countries. The understanding and judgment can differ in various practicing nations such as Iran and Malaysia, which affect product definitions, practices' permissibility and the distinction between Islamic finance and Islamists. Therefore, our process in hand-collecting bank data is less complicated.

Another reason to study the GCC Islamic banks is the presence of a formal banking and finance authority. Alongside the central banks, the GCC is home to four Islamic finance regulation bodies: The Liquidity Management Centre (LMC), The International Islamic Financial Market (IIFM) and The Islamic International Rating Agency (IIRC) and the AAOIFI. That ensures the quality and consistency of information disclosure.

The Gulf Council was established in 1981. It incorporates Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE. In addition to being geographic neighbours, these countries share political, demographic and economic aspects. For example, in 2011, GCC countries agreed on a Marshall plan to aid member countries needing to improve social and economic conditions. In 2014, Bahrain utilized USD 4.4bn of the granted amount.

Islamic banking and finance operated in Bahrain for more than 30 years. The first Islamic bank was established in 1979 and Bahrain currently hosts the largest number of Islamic banks. It is a pioneer in the Islamic capital market; it issued its first sovereign sukuk in 2001. According to IMF (2017), profit-sharing investment funds participate in almost 30% of Islamic banks' assets funding. On the other hand, Saudi Arabia has the largest national Islamic banking market. It dominates with 51.2% of the total banking system assets. The Saudi Arabia Monetary Authority (SAMA) does not differentiate between Islamic and conventional banks. However, it allows banks to use Murabaha contracts as collateral for repurchase transactions.

Kuwait has a small sukuk market. Scholars believe that the non-existence of a suitable legal framework and the government fiscal surplus discouraged the development of an Islamic capital market in Kuwait. Islamic banking assets represent 35% of the entire banking industry and contribute 60% of income. Five fully-fledged banks represent the industry. Islamic windows are not permitted. Kuwait is the only GCC country to allow Tawarruq (Reserve Commodity Murabaha) financing. According to Sharia scholars, it is a controversial tool that replicates conventional securitization

Seven Islamic banks are operating in the United Arab Emirates, constituting 21.6% of the total banking system assets. Its share in the global Islamic banking market increased to reach 15.4% in 2014. Qatari banks are part of the country's national economic development strategy. They hold a substantial amount of Islamic securities and are of high liquidity.

[8]The Quran is the Islamic holy book, and the Hadith is the collection of the sayings and action of Prophet Mohammed.

III. Literature Review

In this section, we present the literature addressing the gap between Islamic banking's ideological guidelines and actual practices in the industry. We underline the contradiction between addressing the peculiarity of the Islamic banks' business model and the respective evaluation methods. The second subsection shows the conventional diversification theory utilized to support the rationale of this chapter's technique.

I. Islamic Banking: Practice vs Theory

The debate on whether Islamic banking is truly "Islamic" has been going since the early 1990s (Ahmad, 1993; Asutay, 2007, 2012; Bashir, 2001; El-Gamal, 2006; Haron, 2004; Kuran, 1993, 2004). Practitioners and academics strive to understand the nature of the contemporary religion-based financial system. Aggarwal and Yousef (2000) are the first to examine the matter theoretically. They develop a model to investigate the product mix of Islamic banks. Their model shows that participation financing arrangements (PLS) are optimal financing instruments conditional on the degree of agency cost. They examine the model empirically using financial data from banks in Sudan, Iran and other undisclosed countries for the years 1994 and 1995. Results show that Islamic banks provide minimal PLS financing, while debt-like financing is heavily utilized. They suggest that Islamic banks face more agency problems and moral hazard with client entrepreneurs and the underlying projects. That makes debt-like financing such as Murabaha preferred by Islamic banks.[9] They also underline the impact of the economic environment on the operation path of Islamic banks. Aggarwal and Yousef (2000) argue that the ingrained concepts of profit maximisation and the role of interest negate some – if not all – Sharia guidelines.

Likewise, Chong and Liu (2009) report that profit-loss sharing products represent only 0.5% of the total banking assets compared to 11.2% of liabilities. The authors use a Granger causality approach and find a strong correlation between rates on Islamic investment and savings accounts and conventional deposit rates. They argue that such accounts are not interest-free as banks claim. Their results show that Islamic rates of return are lower and less volatile than interest on deposits. These findings contradict the theoretical invocation of Islamic banking practices involving higher risks than ordinary deposits. The findings are based on banking data published by Bank Negara Malaysia for the year 2004. Similar to Aggarwal and Yousef (2000), the authors attribute the results to information asymmetry and moral hazard problems. Furthermore, they underline competition as a key determinant of investments' rate of returns. Operating in a dual banking system exposes banks to withdrawal risk. Paying returns lower than deposits rates might drive away clients despite the religious motives. The study establishes that Islamic banks in Malaysia are not different from their conventional counterparts.

In a way that is similar to our approach, Khan (2010) examines the concentration of PLS products and sukuk facilities in seven large banks in the Middle East, Malaysia and Pakistan for the years 2005 and 2006. His study employs El-Hawary and Grais's (2003) interpretation of

[9] Murabaha is a debt-like Islamic product. It provides financing through a cost-plus sale contract between the bank and the client. See Chapter I for details.

Sharia guidelines. The study's findings attribute the growth and liquidity of Islamic banks to the reluctance of a segment of Muslims to put their money with conventional banks. The author claims that Islamic banks are successful in pretending to be banking "Islamically". The previous three attempts to examine Islamic banks' product mix are empirically modest. The analysis is based on the comparison of asset composition of few banks over a maximum of three consecutive years. To demonstrate the domination of debt-like financing modes in Islamic banks, Nagaoka (2007) presents the values of Islamic banking products of Bank Islam Malaysia Berhad (from 1984-2006) and Dubai Islamic Bank (1988-2006).Our chapter extends this literature by using new hand-collected data from 25 banks over ten years (40 quarters) and formally evaluating Islamic banking products.

The incline towards conventional debt-like products is justified by the practicality of such tools, its aptness for trading activities and convenient monitoring (Sairally, 2002). Further, the concentration of debt-like products in Islamic banks is the symptom and the cause of the social failure of Islamic banking and finance as established by Asutay (2007, 2012); El-Gamal (2006). In particular, by doing so, Islamic banks focus on attaining its business and economic goals at the expense of the purpose of Islamic Sharia Law which is serving the human well-being through social welfare, equality and ethical, economic growth.

Islamic economists encourage the use of PLS based financial instruments. They expressed their preference toward such structures according to Islamic law and the viewpoint of economics. Scholars stress upon the objective of Islamic banks to achieve desirable economic performance in addition to fighting for the competitiveness of the Islamic banking system against the conventional giant. According to Sharia guidelines, PLS facilities should be the core activities of Islamic banks. However, the under-utilization of such products in practice is attributed to the complexity of PLS products' unique financing structure and the need for specialized risk management tools to handle it. The problems of moral hazard, adverse selection and Sharia restrictions make it difficult for banks to offer such products extensively. Additionally, greater supervision should be devoted to information disclosure and operational risk in Islamic banks (Abdul-Rahman et al., 2014; Abedifar et al., 2015; Dar and Presley, 2000; Errico and Farahbaksh, 1998; Khan and Ahmed, 2001; Obaidullah, 2005; Sundararajan and Errico, 2002).[10]

For example, in Mudharabah agreements, the bank can lose control over the financed project when the client is the project manager and the bank is the fund provider.[11] Further, because Mudharabah has a partnership scheme, the bank cannot impose a collateral requirement on the client. The competition with conventional banks might force Islamic financial institutions to pay a certain level of returns to investment account holders regardless of the underlying project or bank performance. Banks use this strategy to mitigate against fund withdrawal risk (Obaidullah, 2005).

[10]More studies theoretically discussing the domination of debt-like financing in Islamic banks include: Pesendorfer and Lehner (2016); Rethel (2011); Shamsudin et al. (2014); Uppal and Mangla (2014).

[11]Mudharabah is a PLS Islamic product. It provides financing through a partnership arrangement between the bank and the client. See Chapter I for details.

If the banks' asset-side has dominating characteristics of equity (more PLS), it might indicate increased risk due to return uncertainty and consequently, result in informed and uninformed bank runs (Beck et al., 2013). On the other hand, the withdrawal risk can be low because PLS facilities are partnership project transactions and both parties share losses and revenues. Another key complexity in PLS structure is establishing a profit-loss quota for each client project correctly. Profit-loss ratios are tailored per project, taking into account the business plan, competitive rates and economic conditions. This an expensive task. Also, the process of due diligence, selection and post-transaction monitoring is critical to reducing adverse investment performance. This stems from the fact that the probability of loss is always present in PLS products.

Azmat et al. (2015) provides a theoretical explanation for the economic incentives of Islamic banks. They argue that because of asymmetric information, Islamic banks must offer modes of financing that will maximize returns and minimize risk at the same time. That is one reason to justify the predominance of debt-like products in banks assets. Specializing in participatory financing require banks to enter into long terms commencements (7 years on average). However, in the case of banks, they rely on short term deposits which expose them to liquidity problems. In an ideal Islamic world, Islamic banks should not fear or even face withdrawal risks, because according to the Islamic banking model, banks can pass any losses to customers as well as refuse withdrawals. Except, this is not the case, where customer pressure and competition may force Islamic banks to be reluctant to enforce their powers fully. Islamic banks' willingness to offer PLS products depends on their depositors' risk appetite and utility function. Risk-averse depositors would demand high-risk premiums from banks investing heavily in PLS. Similarly, such depositors would prefer Sharia-compliant intermediation that offers steady returns. Thus, the economic risk-return and Sharia risk-return profiles are not always aligned (Ahmed, 2014).

Abedifar et al. (2013) raise an important assertion regarding PLS products; they state that its riskiness *"should never be too little or too much"*. Returns generated from PLS transactions affect bank capital structure and bank solvency. A low return investment account can lead to fund withdrawals, adversely affecting liquidity and solvency. In contrast, bank shareholders might be at risk when investment accounts are of high returns. The increment of investment accounts, decrease the ratio of shareholders to account holders; thus, shareholders are obliged to raise capital, or their shares will be diluted. Put differently, at bad times, shareholders might be forced to rescue the bank by bearing losses and transferring their returns to investment accounts holders. Islamic banks refer to the situation as Displaced Commercial Risk (SCR).

Put differently, the operations of Islamic banks rely on asset-based financing rather than the traditional lending/deposit banking. According to Sundararajan and Errico (2002), Islamic banks are more similar to investment companies than conventional banks. They both provide investment services with no guarantee of capital nor the rate of return through different mechanisms. Islamic banks receive funds via partnership arrangements and invest it accordingly, while investment companies sell proportions of projects to the public. Further, investors in investment companies are considered shareholders and are entitled to inside information and voting rights. Investment account holders in Islamic banks are only eligible for their share of

profit from the underlying asset. Accepting such an assertion affects the perception of Islamic banks, its information disclosure and evaluation techniques. Sundararajan and Errico (2002) encourage considering the mix of PLS and non-PLS financing facilities when evaluating Islamic banks.

In line with the above argument, Archer et al. (1998) assert that the risks borne by Mudharabah account holders are similar to those of shareholders. Hence, the agency problem can be controlled if the interests of shareholders and PLS clients are aligned. Farooq and Zaheer (2015, pp. 106) quoted Al-Deehani et al. (1999) stating that *"an increase in investment accounts financing enables the Islamic banking institution to increase both its market value and its shareholders' rate of return at no extra financial risk to the bank."*

Our earlier discussion shows that the literature distinguishes between Islamic and mainstream banking. However, such differences are seldom reflected in the testing and evaluating approaches applied by scholars. For instance, Olson and Zoubi (2017) argue that the two types of banks should not be treated equally in terms of regulations. Nevertheless, they underline that profitability is related to bank-specific characteristics and are not related to whether the bank is Islamic or not. They also assume that all financing facilities in Islamic banks behave as conventional loans by employing ratios such as total loans to total assets, total loans to total deposits, loan loss provisions/total assets and impaired loans/net loans.

Comparably, Khediri et al. (2015) report that asset structure is what constitutes the distinction between conventional and Islamic banks in the GCC region. They use financial ratios and various methodologies such as logistic regression, classification tree and linear discriminant analysis. However, they investigate balance sheet components via ratios such as total loans to total assets and total deposits to equity. The previous ratios aggregate Islamic financing facilities, overlooking its fundamental structural differences. Olson and Zoubi (2008) use accounting ratios for the same goal of identity distinction. The authors acknowledge the Islamic business model by replacing interest income with fee and commission income. However, the aggregate value of loans is used to measure asset structure. Other studies discussing GCC Islamic banking measure financing facilities similarly include Siraj and Pillai (2012), Srairi (2010) and Basu et al. (2015).

In our study, we break down the total loans to total assets ratio to take into consideration the categories of Islamic banking products. That results in categories of banking products with different degrees of Sharia aspirations achievement. We measure the impact of each product category on banks' performance and solvency. We aim to justify the proportions of debt-like and PLS products in Islamic banks empirically. Our results show that while debt-like products are profitable, PLS arrangements are associated with higher solvency levels. In the next section, we discuss the bank diversification theory we use to evaluate Islamic banks concentration. The literature justifies our technique of segregating financing facilities based on contract structures.

II. Banks' Diversification Strategy and Performance

In the previous section, we point out that scholars argue that Islamic banks have a high concentration of debt-like financing, which diminishes their differences with conventional banks. They also claim that such concentration adversely affects Islamic banks and makes them exposed to risks similar to their conventional counterparts. However, our data show that the concentration of each funding type varies over time and across countries. In the second part of the chapter, we view Islamic banks' financing portfolios as a combination of facilities of different degrees of Sharia-compliance. Therefore, the highest degree of Sharia-compliance requires a high concentration of PLS products and low debt-like facilities. However, we observe different patterns of concentrations, which we investigate in this chapter.

Corporate finance theory emphasizes that diversification reduces firms' risk exposure due to the imperfect correlation between different markets, asset types and regions (Haugen and Haugen, 2001). Diversification increases investment opportunities and creates new synergies. For financial firms, diversification encourages monitoring incentive (Cerasi and Daltung, 2000) and decreases intermediation costs (Diamond, 1984). Because of asymmetric information, bank portfolio diversification reduces intermediation costs (Diamond, 1984). Three motives drive diversification strategies: market power, agency and resources (Goddard et al., 2008). Other intentions include reducing idiosyncratic risks and utilizing economies of scale and scope. The findings of Deng et al. (2007) show that expanding the traditional intermediation services results in lower costs of debt. They also underline the association between lower bond yield and geographic, domestic and asset diversification of US bank holding companies. In the case of Islamic banks, another motive might be achieving higher degrees of Sharia-compliance while balancing risk exposure.

On the other hand, scholars assert that when banks possess the expertise and comparative advantage in certain sectors, concentration can be beneficial (Acharya et al., 2006; Campa and Kedia, 2002; Denis et al., 1997; Jensen, 1986; Meyer and Yeager, 2001; Stomper, 2006) . Also, Winton (1999) states that diversification only pays off if the risk of default is moderate. Otherwise, being exposed to several types of borrowers increases risk. Further, diversifying credit lines increases competition, complicating the bank's business activities. Clark et al. (2007) assert that banks are shifting back to traditional lending activities because they find no evidence of risk-return profiles for diversified banks. Banks focus on traditional intimidation because of the stability of business risk and return compared to non-interest activities.

Behr et al. (2007) highlight the trade-off between risk and return in the diversification or concentration strategy. While diversified portfolios are less risky, concentrated portfolios enjoy higher returns. Some banks are obliged by national regulations to direct their loans to certain borrowers. Meyer and Yeager (2001) explain that American law controlled bank competition by imposing geographical concentration through restricting branching in other countries or states.[12] Besides,

[12]For example, commercial banks heavily granting real estate loans were greatly affected by the downturn in real estate prices and agricultural loans defaulted when farmland prices peaked. Besides, interstate diversification enhances production efficiency and the diffusion of deposits has a return trade-off advantage to American bank holding companies.

banks with low diversification levels are subject to greater risks during economic downturns (Diamond, 1984). Banking crises over the past decades provide evidence that loan concentration is a key factor in financial downturns in countries such as Argentina (Bebczuk and Galindo, 2008) and Austria (Rossi et al., 2009).

Banks' diversification strategies affect their benefits. Specifically, with the income diversification strategy, the volatility of non-interest income offsets diversification benefits. The same applies to industry diversification, which increases loan portfolio risks and decreases bank returns. For example, Lepetit et al. (2008) claim that competition leads to restructuring and widening the product mix provided by banks. New lines of business undertaken by banks include investment banking and market trading. Product diversification automatically produces income-source diversification. Offering intermediation and noninterest-bearing activities increases income volatility and risk. Income from noninterest-bearing activities is more volatile because borrowers or lenders can easily find alternatives to that service compared to lending activities. Conversely, it is costly for both the borrower and the bank to invoke the lending relationship before the transaction termination.[13]

The few attempts examining Islamic banks' portfolios focused on the aforementioned revenue diversification. Comparing 62 conventional and 42 Islamic banks in the GCC and Malaysia between 1997 and 2009, Molyneux and Yip (2013) highlight that Islamic banks are focused on financing activities and their non-financing income is less diversified compared to conventional banks. They attributed the low-income volatility of Islamic banks to such concentrated strategies. In a recent study, Abuzayed et al. (2018) examine the relationship between revenue diversification and banks' stability in the GCC. Their sample includes conventional and Islamic banks. They find no relationship between diversification and bank stability in the region. In addition, Islamic banks seem to be less risk-sensitive to diversification compared to their conventional counterparts. It is vital to note that both studies did not define the banking products associated with financing or non-financing income. For example, financing returns can be from lending-like activities or project-based arrangements. Hassan and Grassa (2012) extend the investigation to differentiate between income generated from PLS activities and other returns for 42 banks for the years 2002–2008. Using OLS estimations, they report a significant positive association between PLS activities' income and bank insolvency.

The solvency of Islamic banks is heavily discussed in the literature (Baele et al., 2014; Čihák and Hesse, 2010; Louhichi and Boujelbene, 2016; Rahim et al., 2012). The scope of the available studies focuses on the comparison between the financial stability of Islamic banks and traditional banks. Risks faced by Islamic financial institutions are fundamentally associated with the structure of the Islamic financing modes. Nevertheless, only a few studies incorporated Islamic

[13]Moreover, resources are needed to extend the range of provided services, which leads to higher costs. Noninterest activities can increase banks' financial leverage because regulators do not ask banks to hold capital against such services (DeYoung and Roland, 2001; Stiroh, 2004; Stiroh and Rumble, 2006). The case is reversed for Islamic banks: the non-interest-bearing activities are core, while intermediation services are the diversification tool. Returns from lending and non-interest activities are highly correlated, which eliminates diversification benefits (Lepetit et al., 2008). Factors such as increased competition and fixed costs of fee-based activities strengthen the ties between the two banking products. The authors disaggregated the income resources to distinguish between lending and non-interest activities.

banking products into their testing models. Specifically, Daher et al. (2015) discuss how offering PLS products is associated with an increased risk of adverse and adverse selection affecting banks' solvency. To control for the effect of product type of bank solvency, the authors add the proportion of PLS products and fixed income products to total financing as control variables. However, the paper focuses on the capital buffers established to counter specific risks rather than than the association between risks and financing modes. More recently, Alandejani and Asutay (2017) investigates Islamic banks in the GCC by looking at the determinants of banks' non-performing loans (NPL). The paper highlights that the growth of PLS financings in Islamic banks is significantly associates with less NPL; indicating the relationship between participation financing schemes and bank financial stability. On the other hand, NPL increase as the proportion of fixed income products increase. The paper applies dynamic panel GMM to conduct its investigation. Analogously, Ashraf, Ramady and Albinali (2016) report a positive relationship between Islamic banks income diversification and bank stability.

In our chapter, we examine portfolio diversification by looking at the different products provided by Islamic banks. We follow the approach of De Haas et al. (2010) in their study of the determinants of banks' loan portfolios in transition countries. They categorize loans according to types of customers such as mortgage lending, other household lending, SMEs, large enterprises, state-owned enterprises and other customers. They provide empirical evidence that ownership and bank size significantly affect the focus of each lending line. Likewise, Berger and Black (2011) identify two types of loans: asset-based lending and transaction-based lending. The two categories include several credit lines such as leasing, commercial real estate and equipment loans. They use the previous classification to compare lending technologies in small and large banks. In this chapter, we break-down Islamic banking facilities based on their underlying structure. It is important to note that studies examining the Sharia aspirations by establishing an index, often have applied a similar technique. For instance, the ratio of PLS products to total investments is used as a proxy for the concept of establishing justice of Islamic law. It represents the functional distribution element of the affordable products and services dimension (Antonio et al., 2012; Asutay and Harningtyas, 2015).

The extent to which diversification affects bank performance is marginally covered in the literature. Lepetit et al. (2008) find evidence that expanding into non-interest income sources increases insolvency risk. Similarly, Goddard et al. (2008) suggest that small U.S. credit unions should maintain traditional credit lines and avoid diversification. Rossi et al. (2009), however, empirically investigate Austrian banks and underline a positive relationship between diversification and performance. They specifically show that diversification reduces cost efficiency, risk, provisions and capital requirements. Winton (1999) concludes that the relationship between bank diversification strategy and its performance is U-shaped. In Brazil, the moderately concentrated banks' portfolios enhance returns and reduce risks (Tabak et al., 2011). On the other hand, bank diversification increases the risk of banks in Germany (Behr et al., 2007) and Italy (Acharya et al., 2006). The performance of Chinese firms is adversely affected by such policies (Berger et al., 2010). Finally, Hayden et al. (2007) find that diversification is associated with a reduction in bank returns.

As we mentioned earlier, the core difference between conventional and Islamic banks is the mechanism of providing financing facilities. The lack of data affects the quality of empirical research, which led to questioning the adherence of Islamic banks to Sharia guidelines. Therefore, we investigate the claim that Islamic banks are concentrated with debt-like products and whether that has a significant impact on bank performance and financial stability. We formulate our hypotheses as follows:

H_{01}: There is no significant difference between the impact of debt-like products and PLS arrangement on Islamic banks' performance.

H_{02}: There is no significant difference between the impact of debt-like products and PLS arrangement on Islamic banks' solvency.

H_{03}: The product portfolio of Islamic banks is concentrated.

H_{04}: Diversification/concentration strategies have a significant impact on Islamic banks' performance.

H_{05}: Diversification/concentration strategies have a significant impact on Islamic banks' solvency.

IV. Methodology and Econometric Approach

The objective of this chapter is to examine the product mix of Islamic banks. We first evaluate the impact of the most preferred Islamic financing modes (PLS products) on banks' performance and solvency in contrast to debt-like products (Section I). Second, we measure banks' asset portfolio diversification and its significance to banks' performance and default probability (Section II). Earlier studies criticized Islamic banks for their large proportions of debt-like products. They claim that by offering products that are more familiar to the customers while partially satisfying Sharia aspirations, banks can secure revenues and gain competitiveness. In other words, maintaining some similar grounds with the larger system can assure stability and continuity. We use a hand-collected dataset to formally assess banks product mix and its implications. In the next two sections, we present our estimation approaches.

I. Debt-like vs PLS in Islamic Product Mix

Our novel hand-collected data comprise disaggregated values of each Islamic product for 25 banks operating in the GCC over the period 2006–2016. Such a break-down is not available in any professional banking database and -to our knowledge- it has not been used before to a similar extent, in any previous studies. [14] Our dataset provides an empirical justification for

[14]Professional databases broadly aggregate all Islamic financing facilities under the loans category. In other words, there is no professional source (or database) to collect the historical values of Islamic banking products other than banks' own financial statements and annual reports. Our thesis is the first to put together the quarterly data of the various Islamic financing facilities of 25 banks operating in the heart of the Islamic banking industry;

Islamic banks' product mix. Currently this sector is dominated by debt-like products and there is minimal utilization of PLS arrangements. According to Sharia principles, profit-loss sharing arrangements are the core, most Islamic funding, and the primary means of linking the financial sector with the real economy. However, studies show that the proportion of debt-like products are the highest in Islamic banks, which in practice diminishes any structural difference with their conventional counterparts.

In this chapter, the impact of various Islamic financing facilities on the performance of banks is primarily evaluated by a mixed (multilevel) model. Despite the popularity of this approach in different social sciences research, its application in banking and finance are uncommon. Multilevel models enhance outcomes compared to classical regression; they are also useful for estimation and causal inference and of great importance in prediction (Cameron and Miller, 2015*b*; Cheah, 2009; Gelman, 2006; Rabe-Hesketh and Skrondal, 2008). Mixed models take into consideration the existence of between and within variations among entities and observations. Summary statistics in Table IV.3 show significant between and within variations in the dependent variables and variables of interest. Therefore, it is logical to believe that banks that operate in the same country share characteristics. Thus, they are not completely independent. Likewise, the bank business model, operations, the composition of products and sources of income lead to between-bank variation. Time tendencies might perhaps exist between observations recorded at equal intervals.

Although panel random and fixed effects models takes into consideration clusters, it deals with a single type of cluster separately. Alternatively, multilevel models offer the flexibility to model both variations. The model is also referred to as the variance component model. It does not directly estimate coefficients of random intercepts and coefficients, but it estimates a breakdown of their variances. Hence, the variance produced by mixed models is equal to the sum of the between-entity and within-entity variances. Figures IV.1 illustrate the variation between banks operating in different countries. Similarly, Figures IV.2 and IV.3 show the variation of observations within the same bank and time periods.

Recent studies show that acknowledging the groups nested within the sample can result in more accurate and adequate analysis. Rationalizing nesting banks within and between countries, Dietrich and Wanzenried (2014) find that country-specific macroeconomic dynamics have a substantial role in cross-sectional bank return variations. Factors such as GDP growth, taxation policy and the development of the financial market create discrepancies between banks in low-, middle- and high-income countries. Similarly, Dietrich and Wanzenried (2011) underline a significant negative impact of taxation on banks' performance when considering the structure of clustered cantons beneath the national government. Athanasoglou et al. (2008) claim that inflation positively impacts banks' profitability. That can indicate the its ability to correctly predict inflation and adjust their interest rates accordingly. Also, Beck et al. (2013) state that

the Gulf Cooperation Countries. Therefore, we went through 1,200 financial statements to build a cross-sectional panel dataset comprised of five countries, 25 banks and 40 periods. The remainder bank-specific financial data are obtained from Fitch International Bank Database, SP Global Market Intelligence and Gulfbase.

the market share of Islamic banks in different countries affects the development, sophistication and operations of banks.

Our dataset structure shows observations with two levels of nested groups. Hence, the dataset can be structured as three levels of clusters. Level-1 ten-year quarterly observations are nested in level-2 groups, which are banks. Banks are nested within the third-level of clusters (or superclusters) comprising of countries. Multilevel models enjoy the flexibility to accommodate the fact that entities within a panel are interrelated (Cameron and Miller, 2015*a*). It allows entities to vary due to random effects caused by the shared cluster-specific characteristics. Specifically, at levels two and three, the intercepts vary liberally within entities. Variables with fixed effects are also included in the model. Particularly, this research examines the impact of the variable in the lowest level of the hierarchy measured at two higher levels.

Variables at the lowest level (level 1) include three groups of factors: variables of interest, bank-specific and country-specific control variables. They are time-varying with three dummy variables. At the higher two levels (levels 2 and 3), only random intercepts are included. Table IV.2 demonstrates variables and their corresponding measurements.

To be able to test the impact of Islamic banks' financing comprehensively, we run five versions of the model. We run one estimation for each of the Islamic products, while random intercepts capture country and bank effects. The last model includes all products, and country effects were captured via interactions. Because the number of superclusters is small (five countries), it is likely to expect that the sampling distribution of the estimators is far from normal. However, such distribution issues are of low importance for inference. The model is suitable for the dataset because it meets the minimum number of clusters required for mixed models, which is two or more (Gelman, 2006).

A three-level model can be formally presented as:

$$Y_{itl} = \alpha + \sum_{j=1}^{J} \beta X_{it}^{j} + \sum_{k=1}^{K} \gamma X_{it}^{k} + \sum_{l=1}^{L} \lambda X_{it}^{l} + \xi_{kl}^{(2)} + \xi_{l}^{(3)} + \varepsilon_{itkl} \tag{IV.1}$$

Where $_{it}$ is the performance or solvency of bank i at time t and α is the constant term, with i=1,...,N, and t=1,...,T. X_{it} are groups of regressors. X_{it-1}^{j} are lagged ratios of each Islamic banking product to total assets, X_{it-1}^{k} are bank-specific explanatory variables and X_{it-1}^{l} are macroeconomic variables, while $\xi_{k}^{(2)}$ is the random intercept of banks and ε_{itk} is the idiosyncratic residual specific to each observation in each bank. $\xi_{k}^{(2)}$ is the random intercept for bank k and country l and $\xi_{l}^{(3)}$ is the random intercept for country l. The t is only used to show that the dataset is time series. We use STATA to perform all estimations. STATA written commands allow for a cross-sectional panel multilevel estimation (StataCorp., 2019*a*,*b*). The multilevel or mixed models are fitted via maximum likelihood. We assume one unique variance parameter per random effect and that all covariances are equal to zero. In other words, we specify that all residuals be i.i.d Gaussian with one common variance at the first data level.

The complexity and nature of the dataset imposed restrictions on the appropriate econometric approach to investigate the actual drivers of Islamic financial institutions performance. As this research argues, the fundamentals and values of Islamic banking and finance differ essentially from conventional banks. Hence, the variables of interest are not in line with previous bank-performance literature. As of today, such indicators were never used.

We run Mundlak's (1978) test, which allows for heteroscedastic errors or/and intergroup correlation, as opposed to the Hausman test. The test that the panel-level averages of the time-varying regressors are jointly zero cannot be rejected. That indicates that there is no correlation between the time-invariant unobservable and the regressors, which satisfies the random effects assumptions. The Hausman test (Hausman, 1978) gave the same conclusion by not being able to reject that the differences in coefficients are not systematic. A multicollinearity problem arises when two independent variables are highly correlated. Kervin and Kervin (1992) states that a serious multicollinearity problem arises when exceeding the limit of 0.7. Our results show that all correlation coefficients are below 0.7.

II. Islamic Financing Products and Bank Performance and Stability

The second objective of this chapter is to measure banks' asset portfolio diversification and its significance to banks' performance and default probability. Concentration measures provide an insight into the degree of financing diversification of banks over time. However, we are also interested in the effect of such diversification/concentration on banks' performance and stability. We first investigate the influence of diversification on performance measured by return on assets (ROA).[15] We use Altman's Z-score as a proxy for bank probability of default. We test against both concentration measures.

Similar to most banking studies, the Breusch-Pagan/Cook-Weisberg and White's general tests detected heteroskedasticity when running an OLS estimation (Breusch and Pagan, 1979; Cook and Weisberg, 1983; White, 1980). The Durbin-Watson test also confirmed a first-order serial correlation (Durbin and Watson, 1950). Therefore, we use Feasible Generalized Least Squares (FGLS) estimation to regress returns on bank concentration. It has several advantages: the model allows for group-wise heteroskedasticity and first-order autocorrelation (AR(1)). The model assumes heteroskedasticity across groups and a constant variance within groups (Davidson et al., 1993; Greene, 2012). We perform a modified Wald test of no heteroskedasticity to validate our use of the model. The test indicates that our FGLS model is well specified (Baum, 2001; Hoechle, 2007). This approach is applied in the literature by scholars such as Tabak et al. (2011).[16] We also run a robust random effects panel estimation with standard errors clustered on the bank level. The Hausman test (Hausman, 1978) supports the utilization of random effects against fixed effects. We use country factor variables to account for country effects.

[15] ROA and ROE are used in the literature to measure firm performance and profitability. For example, Goddard et al. (2008).

[16] FGLS is also applied in Islamic banking literature as in Bukair and Abdul Rahman (2015); Mollah and Zaman (2015); Sun et al. (2014) and Bitar et al. (2017).

The base model to examine financing portfolio concentration against bank performance is as follows:

$$Y_{it} = \alpha + \beta CM_{it-1} + \sum_{k=1}^{K} \gamma X_{it-1}^{k} + \sum_{l=1}^{L} \lambda X_{it-1}^{l} + \tau_t + \epsilon_{it} \tag{IV.2}$$

Where Y_{it} is the performance or financial stability of bank i at time t with i=1,...,N, and t=1,...,T. α is the constant term. CM_{it-1} stands for portfolio concentration measure. X_{it} are groups of regressors, where X_{it}^{j} are bank characteristics such as bank size measured by the natural logarithm of total assets, capital adequacy ratio, liquidity and ownership dummy. X_{it}^{l} are macroeconomic variables including GDP growth and dummy variables of the sub-prime crisis and the Arab Spring. τ_t stands for time trend and ϵ_{it} is the residual value specific to each observation in each bank. Variables are lagged to account for the reporting.

Tabak et al. (2011) and Bebczuk and Galindo (2008) assert that bank financing diversification strategy depends on bank size and its ownership type. Therefore, we re-evaluate the above model with interaction terms between the diversification measures and size and ownership dummy as follows:

$$Y_{it} = \alpha + \beta_1 CM_{it-1} + \beta_2 CM_{it-1} \times Owners.Dummy + \sum_{k=1}^{K} \gamma X_{it-1}^{k} + \sum_{l=1}^{L} \lambda X_{it-1}^{l} + \tau_t + \epsilon_{it} \tag{IV.3}$$

$$Y_{it} = \alpha + \beta_1 CM_{it-1} + \beta_2 CM_{it-1} \times Size + \sum_{k=1}^{K} \gamma X_{it-1}^{k} + \sum_{l=1}^{L} \lambda X_{it-1}^{l} + \tau_t + \epsilon_{it} \tag{IV.4}$$

We measure country effects in a similar manner:

$$Y_{it} = \alpha + \beta_1 CM_{it-1} + \beta_2 CM_{it-1} \times Country + \sum_{k=1}^{K} \gamma X_{it-1}^{k} + \sum_{l=1}^{L} \lambda X_{it-1}^{l} + \tau_t + \epsilon_{it} \tag{IV.5}$$

V. Data

I. Sample

Islamic banks provide financing through different channels, but traditional lending is not one of them. The banking products discussed in Chapter I are distinct in structure, risk, contractual requirements and the type of financed project/asset. Although banks report the details of the values of each product, they are not reflected in major databases. Instead, the values of all facilities are aggregated equivalent to conventional loans. Therefore, the researcher is obliged to use the supplied conventional breakdown. For the purpose of our study, we hand-collect the information of different Islamic banking products.

We went through 1,200 financial reports to obtain quarterly financial data of 25 GCC banks for the period from 2006–2016. In addition to annual and financial reports, we use Bankscope,

Fitch International Bank Database, S&P Global Market Intelligence and Gulfbase to verify hand-collected data and obtain other financial information. We adjusted data for computational and classification differences. We acquired macroeconomic data from central banks' websites, as well as the International Monetary Fund (IMF) and World Bank databases.

Our dataset is an unbalanced panel consisting of 25 Islamic banks (N=25) and 40 quarters (T=40). The time frame covers important events such as the 2007–2008 sub-prime crisis, the Arab Spring and plummeting oil prices. The total number of observations is 826. Compared to available studies, the dataset is the largest given the frequency, focus, variables of interest and the region covered. The short time span of data is due to the data availability. Our study is not comparative, therefore expanding sample size by including conventional banks as a control group is not viable (Olson and Zoubi, 2017).[17] Data scarcity and the lack of specialized data sources result in periodical gaps in the relatively small sample. The number of Islamic financial institutions boomed after the year 2006, which makes historical data limited. Data is winsorized at the 5% and 95% levels to control for outliers. As in most cross-sectional panel data, idiosyncratic errors are serially correlated and suffer heterogeneity.

[17] The literature focused on the comparison between Islamic and conventional banks (Hassan and Aliyu, 2018). That produced larger samples with conventional banks representing the majority.

II. Bank Performance and Solvency

To measure bank performance, we use banks' net income to total assets ratio.[18] It is an established measure in the bank diversification literature Molyneux and Yip (2013). Following Molyneux and Yip (2013); Sanya and Wolfe (2011) and Abuzayed et al. (2018) we use two indicators for bank-level stability: Z-score and risk-adjusted return on assets (RAROA).[19] Z-score represents the number of standard deviations banks income should drop before defaulting (Hesse and Cihak, 2007; Laeven and Levine, 2009; Lepetit et al., 2008). It is calculated as follows:

$$Z_{it} = \frac{(ROA_{it} + E/A_{it})}{\sigma_{ROA_{it}}} \tag{IV.6}$$

Where ROA_{it} is banks' return on assets, E/A_{it} is the total equity to total assets ratio and $\sigma_{ROA_{it}}$ is the standard deviation of individual bank's return on assets computed using a three-year (12 quarters) window (Mare et al., 2017).[20,21] Risk-adjusted return on assets is computed as follows:

$$RAROA_{it} = \frac{ROA_{it}}{\sigma_{ROA_{it}}} \tag{IV.7}$$

III. Islamic Banking Product Breakdown

Data in this section represent the key variables. The breakdown of Islamic banking products is hand-collected from the financial statements and annual reports of 25 GCC Islamic banks. For the first part of our analysis, we match the definitions of Islamic products offered by banks in the five GCC countries. That was not a major concern as the Gulf countries encourage banks to comply with AAIOFI requirements. We categorize Islamic banking products in four groups: debt-like, PLS, futures and sukuk. The first includes products with more debt characteristics, which are Murabaha, Ijarah and Wakalah. In the three contracts, the bank and client agree on the financing amount and the repayment scheme with fixed periodic payments. They are similar to conventional collateralized loans.

Profit-loss sharing products make up the second group with Mudharabah and Musharakah contracts. In such arrangements, the bank and client enter into a partnership or project financing agreement. Parties can be active or silent, and a profit-loss sharing quota is agreed-upon. The

[18] The return on equity ratio is another established indicator for bank performance. However, due to the nature of Islamic banking products and the equity characteristics of some products, scholars claim that the ROE ratio does not reflect Islamic bank profitability. For the sake of completeness, we estimate our model using ROE as a performance indicator and present our results in the Appendix.

[19] Due to the nature of Islamic banking products and the equity characteristics of some products, scholars claim that ROE ratio does not reflect Islamic bank profitability. For the sake of completeness, we estimate our model using ROE as a performance indicator and present our results in the Appendix.

[20] Some scholars (Agarwal and Taffler, 2008; Altman and Saunders, 1997) criticize using accounting measures to evaluate bank stability because they are subject to manipulation and are backwards-looking (Abuzayed et al., 2018); they emphasize the importance of using market measures to support accounting-based measures. For our case, measuring bank solvency using market indicators is not possible because the majority of the banks in the sample are not listed, or have only been listed for a short period.

[21] Z-score is used to measure Islamic banks' financial stability by scholars including Abedifar et al. (2013); Ashraf, Rizwan and L'Huillier (2016); Beck et al. (2013); Čihák and Hesse (2010); Hesse and Cihak (2007). Nevertheless, other scholars use non-performing loans (NPL), Tobin-Q and survival studies to investigate Islamic banks' solvency (Alandejani and Asutay, 2017; Hussein, 2016; Kabir et al., 2015; Pappas et al., 2017)

third group includes futures contracts. Although excessive uncertainty is frowned upon in Islamic finance, some activities such as agriculture, trading and construction have exceptions in financing facilities. Salam and Istisna' are the Islamic futures contracts. The last group is sukuk investments. The value of sukuk investments held by Islamic banks has grown substantially in recent years. Banks are the primary investor in sukuk in the region. Banks provide an aggregate amount of sukuk investments without the breakdown of issuers or types:

$$\text{Debt-like Products} = Murabaha + Ijarah + Wakalah \tag{IV.8}$$

$$\text{PLS Products} = Mudharabah + Musharakah \tag{IV.9}$$

$$\text{Futures-like Products} = Salam + Istisna \tag{IV.10}$$

IV. Measuring Islamic Banks' Financing Portfolio Diversification

In this chapter, we explore the degree of Islamic banks' asset portfolio diversification. According to Aggarwal and Yousef (2000) and Olson and Zoubi (2017), Islamic banks' financings are mainly debt-like, resulting in low Sharia-compliance levels. In both papers, the analysis of Islamic financing was based on two to three years of analysis. Using the hand-collected data, we examine the GCC Islamic banks financing concentration over the period 2006–2016 quarterly. Similar to Bebczuk and Galindo (2008), Goddard et al. (2008), Deng et al. (2007), Doukas and Lang (2003), Behr et al. (2007), Hayden et al. (2007) and Tabak et al. (2011) we use two concentration measures: the Herfindahl Hirschman Index and the Shannon Entropy to investigate financing diversification and its impact on bank profitability and financial stability.

In our chapter, we classify Islamic banking products according to the level of achieving the aspirations of Sharia law into four groups. In particular, we consider debt-like products to marginally reflect the objectives of Sharia due to the great resemblance to loans. Whereas, profit-loss sharing facilities fundamentally represent Sharia objectives. The remaining two categories are futures and Islamic investment certificates (sukuk) facilities.

The HHI is the most popular measure of concentration due to its computation and interpretation simplicity. It is defined as the sum of squares of relative exposures. An HHI equal to 1 indicates concentration and that all financing is done via one type of Islamic banking contract (debt-like products in our case). On the other hand, the inferior limit of HHI, which is $1/n$, signifies perfect diversification where all banking contracts carry equal weight in the financing portfolio. It is computed as follows:

$$HHI_{it} = \sum_{c=1}^{n} r_c^2 \tag{IV.11}$$

Where c is the financing type and r is the relative exposure of bank i at time t defined as:

$$r_c = \frac{NominalExposure_{cti}}{TotalExposure_{ti}} \tag{IV.12}$$

Therefore:

$$HHI_{it} = \left[\left(\frac{DLF_{it}}{TF_{it}}\right)^2 + \left(\frac{PLSF_{it}}{TF_{it}}\right)^2 + \left(\frac{FF_{it}}{TF_{it}}\right)^2 + \left(\frac{SF_{it}}{TF_{it}}\right)^2\right] \tag{IV.13}$$

Where DLF, $PLSF$, FF and SF are the values of debt-like financing, profit-loss sharing financing, futures and sukuk investments respectively. TF is the total financing amount. All values are calculated for each bank i at quarter t.

Shannon's Entropy (SE) is our second concentration measure. It is an instrument usually used to indicate a variety of distributions at a given point of time and to measure industrial concentration. Nevertheless, scholars use SE to examine sectoral or geographical concentration (Tabak et al., 2011). Its values range from 0, which represent extreme concentration to $-ln(n)$ indicating perfect diversification. It is defined as in the equation below:

$$SE_{it} = -\sum_{c=1}^{n} r_c \times ln(\frac{1}{r_c}) \tag{IV.14}$$

V. Bank-Specific and Macroeconomic Control Variables

In line with the literature, our chapter considers several bank characteristics that may influence the effect of specific types of financing and asset diversification on bank performance. The variables we include are bank size, equity to assets ratio, bank liquidity, ownership and total financing to total assets ratio. The variables and computations are demonstrated in Table IV.2.

The impact of banks' size is well documented in the literature. Large banks can benefit from economies of scale and thus can make larger financing facilities. They also have a base of diversified high-quality clients with sound and stable financial positions (Hughes et al., 2001; Lepetit et al., 2008). However, their exposure to risk can be substantial. Large banks can ill-use the too-big-to-fail concept and become riskier (Caprio Jr et al., 2010). Comparably, small banks with a majority of domestic customers and a less competitive market have a greater profit margin on business loans. They might also suffer informational disadvantage (Ekpu and Paloni, 2016). Bank size is usually measured as the natural logarithm of total assets. Athanasoglou et al. (2008) suggest a non-linear relationship between bank size and profitability, where a positive relationship is expected between profitability and bank size; however, exceptionally large banks might encounter adverse effects.

Majority shareholders are especially important in GCC banks. The ownership dummy variable states whether the bank is private or state-owned. It takes a value of 1 if the bank is state-owned, and a 0 if it is private. In developing countries, it is typical for governments to have large shares in financial institutions. That, indeed, affects financing activities and profitability. State-owned banks usually are less efficient and less profitable because they have different goals (La Porta et al., 2002). According to Iannotta et al. (2007), banks with a large government stake

are exposed to higher insolvency risk and low-quality funding facilities. In many cases, state-owned banks have lower rates on financing facilities. Further, they might be forced to engage in governmental monetary transactions. Besides, state-owned banks' decisions are sometimes implied by political influence affecting types of projects undertaken and risk appetite. However, they can still benefit from some inside information (Abedifar et al., 2013). On the contrary, private banks are more liberal in terms of investment choices, clients and risk-taking.

We evaluate banks' capital quality using the ratio of total equity to total assets (CAR). A higher ratio is not always preferable as it decreases profitability, although it would reduce risk. A sufficient amount of capital can represent a support cushion in bad times. The capital-profitability relationship is expected to be cyclical. Banks expect higher returns when equity levels are sufficient (Abedifar et al., 2013). The ratio is normally high and positive in periods of distress to assure shareholders about the healthiness of the bank. Diamond (1984) underlines that higher levels of equity enhance the moral hazard problem. At the same time, it can stimulate risk-taking ability.

All banks in the sample operate in dual banking systems. Domestic interest rates drive operations and risk appetite of both banking systems because of the fact of coexistence and competition. Higher interest rates would increase banks' risk aversion and consequently slow down funding, leading to lower profitability. Sundararajan and Errico (2002) and others state that the effect of interest rates on Islamic banks is indirect through determining the markup rates for Murabaha and Ijarah financing only. Abedifar et al. (2013) observe that Islamic and commercial banks react in the same manner to changes in interest rates.

The relationship between inflation, interest rates and bank profitability is still cryptic. From a conventional banking perspective, interest rates that incorporate expected inflation are the basis on which loans are priced, and deposits are assigned their proceeds. That is particularly important because all banks in this dataset operate in a dual banking system. Islamic banks are forced to match their profit rates with conventional interest rates because of the competition with conventional banks and to attract more clients (Imam and Kpodar, 2013). That would be through choosing projects and investments of the required profit rate. Some scholars (Chong and Liu, 2009; Khan, 1987) assert that the profit rate of Islamic banks is positively related to the conventional lending interest rate. They suggest that, in the long run, conventional banks are more efficacious. For each GCC country, current inflation and central banks' interest rates are used.

All GCC countries are oil and gas exporters, and their revenues play a great role in their national monetary decisions. We include oil prices as a control variable in this chapter. Jawadi et al. (2017) report a significant positive impact of oil prices on the performance of Islamic finance. On the contrary, Zantioti (2009) provides empirical evidence that oil prices affect Islamic banks in North Africa and South Asia, but not in the Middle East.

The 2008 financial crisis is a critical changing point in the global banking economy. Almost all banks around the world have been affected by the downturn to different degrees. Many Islamic finance and banking studies state that the interest-free policy was a safety cushion during the

crisis, especially in the GCC region (Al-Khouri and Arouri, 2016; Alqahtani and Mayes, 2018; Grira et al., 2016; Khediri et al., 2015; Olson and Zoubi, 2017). They claim that Islamic banks were the least harmed by the crisis. Hence, we add a time dummy to our estimation. We also include a dummy variable of the Arab Spring that arose in the Middle East early 2011. The unrest affected the Gulf countries directly and indirectly.

VI. Results and Discussion

Islamic banks in the GCC were most profitable before the 2008 financial crisis. Towards the end of 2009, profitability rates plummeted substantially. Since then, the data show a steady improvement in ROA and ROE values, demonstrating recovery. In line with the risk-return argument, Islamic banks' solvency was the highest during the period 2011–2014; however, as profitability increases, solvency seems to deteriorate (Figures IV.5 and IV.8).

I. Debt-like or PLS?

Our data show that the proportion of debt-like products has a positive pattern as underlined in previous studies. It grew from 40% in 2006 to almost 60% in 2016. One can notice drops during the Arab Spring and the Oil crisis. On the contrary, the proportion of PLS products is volatile. A considerable jump is noticeable after the crisis, where PLS reached an overall maximum of 6.3%. However, that is followed by a slight decrease until the year 2016. Bank sukuk investments have an increasing pattern over the sample period, despite a significant drop during the 2008 financial crisis. The value of sukuk hiked in 2012; the year saw the involvement of the Gulf countries in the political unrest in Yemen and the depression of oil prices. In the same period, Qatar issued USD 1.28bn worth of sovereign sukuk in 2014 as part of the national development plan. The plan involves the preparations for hosting 2022 FIFA World Cup. Finally, future contracts represent a small proportion of banking assets, which continued to diminish over time. Futures are controversial because only a limited number of projects or transactions can be executed under such contracts (Figure IV.7).

The ratio of each product to total assets at the country level provides further insights. Debt-like products are below 50% of total assets in Bahrain and Saudi Arabia; they are 70% in the remaining countries. The fluctuations and pattern are different in each country. While banks in Kuwait do not offer PLS products, it is a little below 15% of total assets in Saudi Arabia where they reached a maximum of 20% in some periods. The proportion of PLS products has been fluctuating in all GCC countries, but a clear decrease is apparent towards the end of the sample. Following the crisis, future contracts has been offered less in all GCC countries except for Qatar. Bank sukuk investments have been increasing n Saudi, Kuwait and the UAE (Figure IV.8–IV.11).[22]

[22]Within country differences highlight interesting insights. In Bahrain, we notice that the proportion of debt-like financing reached as high as 60-80% of total assets, for example in ABC bank. On the contrary, AlSalam bank maintains an average of 20–30%. A similar discrepancy can be observed in Saudi Arabia, Kuwait and the UAE. All banks in Qatar sustain a close average ratio of debt-like products. Banks' PLS majority exposure is limited to a small number of banks in all countries (except for Kuwait). In Saudi, a single bank is the primary

In the first part of our chapter, we study the impact of debt-like banking products on Islamic banks' performance and solvency compared to PLS financing modes which reflect the real spirit of Islam. Due to lack of data, such an investigation has not been done before. Our novel hand-collected sample allow us to investigate Islamic banks' product mix. We run a mixed model estimation to achieve our goal.[23] The literature (Aggarwal and Yousef, 2000; Khan, 2010) criticized Islamic banks for deviating from the ideal Islamic banking products (PLS-based) to a conventional loan-deposit approach.

We compare the effect of each funding source on bank performance by estimating a multilevel model for each type of product separately (Tables IV.8–IV.10). We measure firm profitability by the ratio of net income to total assets. We use two measures for bank stability: Z-score and risk-adjusted ROA.

We find that the proportion of debt-like products are significantly and positively impacts bank returns. On the other hand, the effect of PLS financing products is not significant. Therefore, our first hypothesis is rejected. The impact of each banking product is significantly different. The findings indicate that a rational justification for the larger proportion of debt-like products in Islamic banks' financials is its contribution to returns. This explains banks overlooking some controversial features of debt-like products such as binding effect of Murabaha contract, penalties for payment delays and the mark up rates Nagaoka (2007). Compared to PLS, such arrangements guarantee a significant percentage of predictable revenues. It also requires less monitoring.

Our results also show that as the percentage of debt-products increases, the probability of bank default increases. That is in line with the literature stating that debt-based financing constitutes more risk, causing financial fragility. The opposite is true for PLS-based products. As scholars (Aggarwal and Yousef, 2000; Alandejani and Asutay, 2017; Errico and Farahbaksh, 1998; Obaidullah, 2005) suggest, PLS products contribute to the stability of banks because their structure is based on the partnership agreement between banks and clients, which motivates active monitoring and involvement in the execution of the underlying project/asset. Therefore, the results confirm that Islamic banks are willing to offer all types of Sharia-compliant products. However, they try to balance risk and return issues. Specifically, while debt-like products are more profitable, PLS products provide higher degrees of financial stability. Accordingly, we reject the second hypothesis.

The estimation output offers further exploration. Contracts such as Salam and Istisna'a are the exception of accepted forward contracts in Islamic finance. They are directly linked to

provider of such products. The same is observed in Qatar with the same magnitude of fluctuations. The number of banks offering futures contracts is smaller. In each GCC country, a maximum of two banks offers most of such contracts. Jazeera bank in Saudi Arabia is leading in future contracts and sukuk investments. In Kuwait, Warba bank is the major sukuk investor. Banks in Bahrain and Saudi all invest in sukuk with different scales. Sukuk investments in Qatari banks have an identical pattern as with the products above.

[23]There is consent in the literature on the problem of endogeneity when examining bank performance and stability via the accounting approach. Therefore, it is recommended to use GMM models for estimations. However, due to the small number of observations and the imbalance of observations per bank, the application of GMM was not feasible, as it resulted in a huge number of instruments. We present the GMM regressions results in the Appendix.

agricultural projects, small traders and manufacturers. Both products involve the delivery of a product/project toward the end of a specified period. Therefore, they are not tradeable as they constitute pure debt. Islamic principles impose a set of restrictions on the commodity/project that can be financed through such contracts to avoid the prohibited excessive uncertainties. That does not change the fact that such financing arrangements involve higher degrees of price risk and construction-related risks. As we presented earlier, future contracts are small in banks due to the complexity of cash flows and risks. We find a positive and significant relationship between this product group and the performance of GCC banks. The coefficient in Table IV.10 shows an adverse impact of such products on banks' stability.

Given the noticeable increase in the level of sukuk investments by Islamic banks in the GCC region, we expected to find that it has a significant role in banks' solvency and profitability. However, our results show otherwise.[24] As highlighted previously, governments of the GCC countries use sukuk as a monetary policy tool to assist Islamic banks manage their liquidity issues. Islamic banks are limited when it comes to utilizing money market instruments. Sharia guidelines forbid banks from investing in bonds, treasury bills and derivatives. Sovereign sukuk are usually issued to finance infrastructure projects that require a relatively long period to be completed, while their returns are usually obtained after that. Thus, sukuk investments might need more time to be reflected by banks' returns.

In terms of control variables, the time trend shows a significant impact of certain quarters in the sample. Our findings show that as bank size increases, profitability increases and solvency decreases. The same applies to liquidity; higher liquidity is associated with more profits and low z-scores. The equity to assets ratio is positively and significantly associated with the performance of GCC Islamic banks. That emphasizes the perception of equity to Islamic banks compared to the destructive nature of the debt. We also underline a strong direct association between Islamic banks' performance and solvency with GDP growth in all models' specifications.

As in Sanya and Wolfe (2011), we find that government effectiveness enhances the solvency of Islamic banks. The role of regulation and supervision is critical in the case of Islamic banks. Islamic banking is a niche in most countries due to its' different and specific requirements. Therefore, countries had to go through reforms and establish specific bodies to monitor and evaluate the new financial institutions. Further, our results show that contrary to Khediri et al. (2015), Olson and Zoubi (2017) and Alqahtani and Mayes (2018), the 2008 financial crisis had no significant impact on banks' returns or solvency. However, the 2011 Arab Spring, represented by a dummy variable, significantly adversely affected the solvency of Islamic banks in the GCC.

[24] At the country level, we find that sukuk is significant to the profitability of banks in Bahrain, but it is significantly harmful to the returns of banks in Kuwait and Qatar. Our results also reflect the impact of national policy on banks' product mix. For example, debt products affect bank revenues positively in Kuwait and the UAE, while they do so negatively in Qatar. Meanwhile, PLS products are negatively related to Bahrain's and Qatar's returns. Sukuk negatively affect returns in Kuwait and Qatar, while the reverse is true in Bahrain. Futures have a significant impact on the returns of banks operating in Qatar and the UAE. The previous findings underline that a country such as Kuwait has minimal interest in the degree of Sharia-compliance of banking products; they prioritize securing profits from debt-like products. However, Bahrain and Qatar, with clear policies of Islamic banking and financial empowerment, undertook initiatives to adhere to Sharia principles and are penalized through depressed profitability. On the other hand, they record better degrees of solvency (Table IV.11). Results are confirmed when running the regression with all products together.

Most of the studies stress that oil revenues are key to Islamic banking; they specifically state that they are the primary reason they exist. We find no significant relationship between oil prices and the performance or solvency of banks.

II. Islamic Banking Product Mix and Portfolio Diversification

The second objective of our chapter is to investigate the diversification of Islamic banks' asset portfolios. Previous studies' discussion of product mix is confined to two-period comparisons. They highlight the large proportions of debt-like products and criticized such "concentration" for diverting the operations of Islamic banks away from the aspirations of Islamic law and inclining toward conventional banking. In our chapter, the hand-collected dataset allows us to compute diversification measures to investigate the degree of asset portfolio concentration. We use two indicators to measure diversification: Herfindahl Hirschman Index (HHI) and Shannon Entropy (SE).

We notice that, overall, product diversification has three phases. In the first phase (2006Q3–2008Q2), banks were diversified, on average. During the 2008 financial crisis (2008Q3–2010Q4), diversification levels decreased but started to pick up in early 2011. That shows that the financial crisis did not affect the profit of Islamic banks (Alqahtani and Mayes, 2018; Khediri et al., 2015; Olson and Zoubi, 2017), but it might have an impact on offered products, as the data demonstrate. On the country level, banks in Bahrain and Saudi have higher diversification levels with a maximum HHI of a little above 0.6. The UAE bank diversification follows with slightly lower averages. Qatar banks were highly concentrated at the beginning of the sample period. However, they decrease to reach the levels of Bahrain and KSA portfolios. Kuwait, on the other hand, has the highest portfolio concentration degrees.

The impact of the product mix on banks' performance and stability is important to understand the basis on which banks offer Sharia-compliance products. We estimate the effect of bank diversification on bank performance and stability by running several specifications of FGLS models. We find that concentrated portfolios are less profitable, however, they are associated with lower probabilities of default. The results are robust, using both diversification measures. The results confirm that by diversification through offering a range of products which achieve Sharia aspirations at different levels, providing more Sharia-compliant products, banks could record higher returns, but banks' costs would increase, in addition to the exposure to different risk types due to the unlimited possibilities of project-based funding. Asset portfolio diversification is beneficial in terms of bank solvency. Our results are in line with the observations in the literature about the risk-return trade-off aspect of diversification. Tables IV.12 to IV.14 present our estimation output.[25]

However, the argument that Islamic banks are under-investing in participation financing facilities is still valid. PLS contracts suffer from high degrees of adverse selection and moral hazard when

[25]Tables IV.15 and IV.16 present our estimation results when performance is measured with ROE and bank solvency is measured by risk-adjusted ROE. Given the dispute of the adequacy of ROE to measure Islamic banks' performance, we show the results for completeness.

compared to other banking products. The primary reason for such information asymmetry is the low quality of financial information in countries hosting Islamic banks (Azmat et al., 2015). Governments are taking steps toward such information disclosure. At the institutional level, central banks of GCC countries have made compliance with AAOIFI and IFRS standards compulsory. Corporations and SMEs are all to be registered and report to designated automated systems operated by the authorities. The case is similar to the country level; most GCC countries established a national cloud, connecting all governmental bodies with personal information of the population.

Thus, this chapter argues that to be able to conduct a thorough analysis of Islamic banks it is vital to keep in mind the fact that Islamic banking abandoned its role as a venture capital provider and leaned toward being an intermediation institution for several reasons. It commenced its operations' at a time when mainstream banking had already established its fundamentals a long time ago. Human capital running Islamic banks is mostly from a conventional banking background, which can cause unintentional concept distortion. Further, Sharia committees, culture and, in some cases, even academia participated in establishing the concept of Islamic banking as a special intermediation institution to channel Muslim funds. Customers' mindset and knowledge another reason why Islamic banks are conducting business the way they do. Our results, when compared to previous similar work, partially confirm Ahmad's (1993) statement regarding the transition period is relevant, at least to some extent. They argue that the domination of Islamic banks' assets by Murabaha and Ijarah is temporary. They claim that Islamic banking and finance has been going through a transition period where it has to familiarize the audience with its products and core activities. As there is no definition or duration of such a progression period, findings of this study show evidence that Islamic banks "in the GCC at least" are moving forward in that phase.

In all respects, the investigation of segregated Islamic facilities, in addition to country and bank-specific features, allows for a deeper analysis of the banking sector. If measured by volume, the industry is still dominated by Murabaha and Ijarah products, which contribute to profits. On the other hand, the fraction of PLS is trivial when compared to debt-like financing, however, it significantly improve solvency. That is not to claim that Islamic banks are operating entirely in the spirit of Islamic law and achieving its socio-economic goals at this stage. Nevertheless, the fundamental differences between the two banking systems are to be acknowledged in reporting and testing methodologies.

VII. Robustness Checks

I. Product Mix and Bank Size

According to Berger and Black (2011), bank size has a significant role in the composition of banks' products. For instance, large banks rely on hard information; therefore, they provide fixed-asset collateral facilities. On the other hand, small banks utilize soft information to offer financing products; they provide funding based on established relationships. Similarly, Islamic

banking products have requirements ranging from hard information for debt-like products and soft information for PLS products. Hence, in this section, we examine the relationship between banks' product mix and banks' performance and solvency, taking into account bank size. We divide banks in the sample into three categories: small, medium and large banks, where small banks lay in the top 25th percentile of total assets, medium banks are with total assets between the 25th and 75th percentile. Large banks are with total assets beyond the 75th percentile of total assets. We introduce a dummy variable that takes values from 1 to 3, for small, medium and large banks, respectively. We re-estimate Equation (IV.1) with adding an interaction term between each product type and firm size dummy variable.

We compute the marginal effects of each banking product on bank performance with respect to bank size (Table IV.17). It shows that debt-like products positively affect bank returns in small and medium banks while its insignificant in large banks. However, PLS products significantly and positively affect bank returns in large banks. Future products positively affect large and medium banks. The results indicate that small banks can only afford products with the least sharia compliance levels and more hard information. Large banks, however, have the means to afford the legal, Sharia and banking considerations required for products such as PLS and futures. PLS products also require a longer-term commitment to certain projects/assets. Panels (B) and (C) in Table IV.17 show the impact of products on bank probability of default according to bank size. For example, the profit-loss sharing product enhances solvency in large and medium banks. However, it harms small firms. The effect of sukuk is not clear concerning large banks. Figures IV.24–IV.26 illustrate the marginal effects. The findings provide further insights into banks' asset portfolios. It shows that only large banks have the means to offer high Sharia-compliance products such as the PLS facilities.

II. Islamic Income Portfolio Diversification

Molyneux and Yip (2013) and Abuzayed et al. (2018) examine Islamic banks' portfolios diversification by examining their income portfolios. In this chapter, we argue that reported income sources do not necessarily reflect the assets generating such returns. Therefore, we construct additional diversification measures based on income sources. Islamic banks report three income types: income from financing activities, income from investments and fee and commission income. In line with Molyneux and Yip (2013) and Abuzayed et al. (2018), our data show that income from financing activities comprise the greatest proportion of income. Investment, fee and commission income have comparable levels. The Herfindahl Hirschman Index (HHI) and Shannon Entropy (SE) show that income portfolios – on average – where highly concentrated in the early periods of the sample. Portfolio concentration dropped during the 2008 financial crisis (Figures IV.27 and IV.28).

If income from financing is solely generated from debt-like products, and PLS products are the source of investment income, then, the effect of income and asset diversification on bank performance and solvency should be identical. Hence, we re-estimate Equations IV.2 - IV.5 using income-based diversification measures. Table IV.18 present our estimation results. Similar to

our main findings, results show that income portfolio concentration is harmful to bank returns, but it is positively related to bank solvency. Molyneux and Yip (2013) report a similar finding. Nevertheless, the effect of income portfolio diversification on bank returns' and solvency is not statically significant, compared to asset portfolio diversification in our main analysis.

III. The Endogenity of Bank Performance

Accounting information reporting is a build-on process causing sequential entries to be correlated. That necessitates the consideration of including lags of the dependent variable to capture performance fluctuations, especially in investment banks. Therefore, we re-estimate the relationship between banking products and firm performance using a one-step GMM estimation (Arellano and Bond, 1991). The model is able to capture the behaviour of investment banks in the sample. Their returns fluctuations were not captured by the mixed model estimated earlier. We exclude investment banks from the sample in our main analyses because they had outliers and higher variation.

Recent studies of the bank performance, both Islamic and conventional, claim that random and fixed effects econometric treatments of panel data are not optimal (Chowdhury et al., 2017). That is due to unobserved heterogeneity, endogeneity and the correlation between the lagged-dependent variable and the regressors. Athanasoglou et al. (2008) indicate that bank profitability is persistent over time and it can affect next periods' profit. Bank returns can be persistent for different reasons such as low levels of market competition, sensitivity to macroeconomic shocks and regional events, and informal opacity (Berger, 1995).

We employ Arellano and Bond's (1991) dynamic GMM to capture which financing facility is key to Islamic banks performance. Because the dataset has a quarterly frequency, a one period lag of the dependent variable is added to the model, instrumented by the second, third and fourth lag of the dependent variable, in addition to the fourth lag of bank size. The null hypothesis of the Arellano and Bond test for zero autocorrelation in first-differenced errors was rejected in all three lags. Further, at the 5% significance level, over-identifying restrictions were valid.

$$Y_{it} = \alpha + \delta Y_{it-1} + \sum_{j=1}^{J} \beta X_{it}^{j} + \sum_{l=1}^{L} \gamma X_{it}^{l} + \sum_{m=1}^{M} \lambda X_{it}^{m} + \varepsilon_{it} \tag{IV.15}$$

Where $_{it-1}$ is the first lag of the dependent variable (performance or solvency), and δ gives an indication about the market competitiveness by measuring the speed with which returns adjust to equilibrium. The market is fairly competitive when returns revert to their average values (zero); that is when δ =0. The opposite is true. A δ closer to 1 implies a less competitive market where adjustments to equilibrium are slow.

We apply the dynamic GMM model to capture fluctuations of investment banks that were not fully captured by the mixed model estimation. Tables IV.19 show our estimation results. The distortion in results can be explained by the inability to estimate time-invariant dummy variables and accounting for country-specific effects by factoring variables. Also, the inclusion of the

lagged independent variable in a short-unbalanced panel drop the sample size and increase the number of instruments. For instance, the dynamic GMM estimation demonstrates that debt-like products significantly harm banks' profitability, while other financing products are insignificant. On the other hand, only sukuk investments are found to impact bank solvency significantly. The cost-to-income ratio shows a positive and significant impact on bank performance. The change in inflation is the only significant macroeconomic variable with a positive sign. Our results show that the GCC banking sector is competitive as δ is equal to 0.391. Similarly, we estimate the relationship between bank returns and asset portfolio diversification using dynamic GMM (Table IV.20). As mentioned earlier, results are distorted due to the relatively small and imbalanced sample. Similar to the FGLS model, we find that portfolio concentration depresses returns when measured by ROA. On the other hand, portfolio concentration reduces risk. Both results are only significant at the 10% significance level.

VIII. Conclusion

As the debate continues about how Islamic "Islamic" banks are; there have been few or no attempts to examine the matter differently. This chapter examines the impact of each Islamic banking product separately on bank performance in five GCC countries. It also investigates the diversification of banks' asset portfolios using new hand-collected quarterly data and various econometric approaches. In contrast to previous studies, financing facilities are disaggregated based on the contract type. That results in four product categories that achieve the aspirations of Sharia law at different levels. Using hand-collected data, the first part of the chapter shows that the proportion of debt-like banking products varies between countries and banks. However, it is still dominating the banks' assets side because they significantly contribute its returns. Thus, utilizing Sharia-compliant products to attain business and economic objectives (Aggarwal and Yousef, 2000; Asutay, 2007, 2012; Chong and Liu, 2009; Khan, 2010; Nagaoka, 2007).

Meanwhile, PLS contracts represent, on average, 5% of banks' total assets and significantly reduce banks' probability of default. The share of PLS facilities is increasing, and their impact on bank performance is significant despite its small value. We attribute that to the participatory structure of PLS, which encourages parties involvement and actives monitoring. Therefore, financing modes fulfilling Islamic law aspirations promote financial stability (Asutay, 2007) when adequately utilized despite the high risk associated with such structures (Abedifar et al., 2013; Azmat et al., 2015).

Our chapter succeeds in underlining that Islamic banks solvency can be harmed by product portfolio diversification and offering financing modes that vary in the fulfilment of Sharia aspirations. That suggests that concentration and specialization is a feasible solution for Islamic banks. Therefore, the industry can host two types of Islamic financial institutions. First, Islamic financial intermediations which exclusively offer debt-like products and its goal is to channel funds between investors and borrows according to the Islamic law. Second is Islamic investment banks that are specialized in providing Sharia-compliant investment solutions ranging from micro-financing to large and infrastructure projects. That, would assists financial institu-

tions to focus on achieving specific objectives, fully utilize resources, attract and train designated expert human capital. The relationship between Islamic banking product mix and performance and solvency conveys information about banks' and nations' strategy toward Islamic banking and finance. It demonstrates the combination of economic and social goals of Islamic Sharia adopted by Islamic financial intuitions. For instance, Kuwait has zero PLS-based banking products, whereas the proportion of PLS in the UAE and Qatar is increasing substantially.

This chapter also highlights the importance of taking into account the conceptual differences between Islamic and conventional intermediation. That, suggests that evaluation approaches approach are not necessarily the same for both systems, and the overlap can lead to inference fallacies. The distinct impact of each Islamic financing mode on banks' financial stability and performance emphasizes the urgency to develop a model to evaluate Islamic banks incorporating its product mix and non-conventional operations. Accurate evaluation of Islamic financial institutions is vital for policymakers, investors and customers. The cooperation between academics and practitioners can produce new evaluation scheme to understand and assess Islamic banks within the mainstream. That can also yield in databases tailored for Islamic reporting, as data availability and timeliness have been a significant challenge in producing this chapter.

The findings of this chapter are based on Islamic banks in the GCC countries, which have a similar interpretation of Islamic law. A logical extension would be to expand the sample for more states, that will highlight cross-sectional discrepancies and gave more insights about the role of Sharia and Sharia scholars on banking products. Also, controlling for sectors served by Islamic banks can distinguish between its retail and trading operations and its participatory financing schemes.

IX. Appendix

I. Tables

Table IV.1.: Descriptive statistics of Islamic banking products

Variable		Mean	Std. Dev.	Min	Max	Observations
Debt-like Financing	overall	0.5268853	0.1743356	0.0844631	1.022077	N = 826
	between		0.1577363	0.214807	0.7723867	n = 25
	within		0.086497	0.039853	0.8848001	T-bar = 33.04
Murabaha	overall	0.3938548	0.1714763	0.0711281	0.9006296	N = 826
	between		0.1579972	0.0908704	0.6600821	n = 25
	within		0.0818653	-0.0068213	0.7268714	T-bar = 33.04
Ijara	overall	0.1198229	0.1025339	0	0.4306546	N = 826
	between		0.0953479	0	0.3297346	n = 25
	within		0.0408444	-0.1521133	0.2785413	T-bar = 33.04
Wakalah	overall	0.0132076	0.046851	0	0.376274	N = 826
	between		0 .0307494	0	0.1355351	n = 25
	within		0.035727	-0.1223275	0.2539465	T- bar = 33.04
PLS Financing	overall	0.0508766	0.0756359	0	0.4439087	N = 825
	between		0.0787864	0	0.3694283	n = 25
	within		0.0280981	-0.0536435	0.1784228	T-bar = 33
Musharaka	overall	0.0320316	0.0694061	0	0.4439087	N = 825
	between		0.0767316	0	0.3694283	n = 25
	within		0.0170407	-0.0330296	0.106512	T-bar = 33
Mudharaba	overall	0.0188222	0.034354	0	0.1842187	N = 826
	between		0.0246968	0	0.0864585	n = 25
	within		0.023992	-0.0676364	0.1650248	bar = 33.04
Futures Financing	overall	0.0199869	0.050884	0	0.3909574	N = 826
	between		0.0445587	0	0.2073919	n = 25
	within		0.0181647	-0.0832698	0.2035524	T-bar = 33.04
Salam	overall	0.0019861	0.0102295	0	0.0896022	N = 826
	between		0.0068607	0	0.0340279	n = 25
	within		0.0070192	-0.0320419	0.0575603	T-bar = 33.04
Ististna	overall	0.0180009	0.0494468	0	0.3909574	N = 826
	between		0.0426264	0	0.2073919	n = 25
	within		0.0193835	-0.0852558	0.2015663	T-bar = 33.04
Sukuk	overall	0.0810336	0.0734297	0	0.4218369	N = 826
	between		0.0639949	0.0045855	0.2512922	n = 25
	within		0.0405124	-0.1181842	0.2515784	T-bar = 33.04

The table presents descriptive statistics of Islamic Banking Products. Quarterly data is hand-collected from banks' financial reports over the period from 2006-2016. Debt like financing are Islamic products with more debt characteristics, it is equal to Murabaha + Ijarah. PLS financing are Islamic banking products with more equity features, it includes Musharaka and Mudharaba contracts. Salam and Istisna are future-like Islamic banking products. Sukuk are Islamic investment securities. Values are collected for each bank in each quarter.

Table IV.2.: Variables definition

Variable	Definition	Data sources and previous studies
1. Dependent Variables		
a. Bank performance measures		
ROA	Return on assets measured by net income divided by total assets	Financial reports, FitchConnect, Gulfbase
ROE	Return on equity measured by net income divided by total equity	Financial reports, FitchConnect, Gulfbase
b. Bank stability measures		
Z-score	Individual bank solvency measured by $Z_{it} = \frac{(ROA_{it}+E/A_{it})}{\sigma_{ROA_{it}}}$	Author's computation
	E/A = the ratio of total equity to total assets	Financial reports, FitchConnect, Gulfbase
Risk-adjust ROA	ROA divided by the standard deviation of ROA	Author's computation
Risk-adjust ROE	ROA divided by the standard deviation of ROE	Author's computation
2. Independent Variables of Interest		
a. Variables of Interest		
Debt-like products	Murabaha +Ijarah + Waklah/ Total Assets	Author's computation, Financial reports, FitchConnect
PLS	Mudharabah +Musharakah/ Total Assets	Author's computation, Financial reports, FitchConnect
Futures	Salam + Istisna/Total Assets	Author's computation, Financial reports, FitchConnect
Sukuk	Islamic investment securities = Sukuk/ Total Assets	Author's computation, Financial reports, FitchConnect
HHI	Hirschman-Herfindahl Index (HHI) for each bank	Author's computation
SE	Shannon Entropy	Author's computation
b. Bank specific variables		
Size	Bank size measured by the natural logarithm of total assets	Financial reports, FitchConnect, Gulfbase
CAR	Bank capital quality measured by the E/A ratio	Financial reports, FitchConnect, Gulfbase
Liquidity	Bank liquidity measured by the ratio of total liabilities to total assets	Financial reports, FitchConnect, Gulfbase
Total financing	Total financing to total assets	Financial reports, FitchConnect, Gulfbase
Ownership	A dummy variable = 1 if bank is state-owned, and equal for private banks	Financial reports, FitchConnect, Gulfbase
c. Macroeconomic variables		
GDP Growth	GDP Growth	World Bank Economic Indicators
ΔCPI	Percentage change in inflation levels	World Bank Economic Indicators
GE	Government effectiveness: An aggregate governance indicator computed from six individual indicators: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Higher values indicate better governance.	The Worldwide Governance Indicators (WGI) project
Oil	Quarterly average oil prices	DataStream
Arab Spring	A dummy variable indicating the unrest in the Middle East in 2011-2014	
2008 Crisis	A dummy variable that takes a value of one during 2008 and 2009	
Country	A dummy variable that takes values from 1 to 5 representing the five GCC countries: 1= BAH= Bahrain, 2= KSA=Saudi Arabia, 3= KUW= Kuwait, 4= QAT= Qatar, 5= UAE= Emirates	

Table IV.3.: Descriptive statistics of the dependent variables and the variables of interests

Variable		Mean	Std. Dev.	Min	Max	Observations
(1) Dependent variables						
ROA	overall	0.01241	0.01392	-0.0146	0.0441	N = 826
	between		0.00996	-0.00815	0.03131	n = 25
	within		0.01021	-0.01232	0.05295	T-T-bar = 33.04
Z-score	overall	20.75025	14.86156	4.76033	60.62432	N = 826
	between		14.96634	5.77605	60.62432	n = 25
	within		5.47468	4.95853	58.20713	T-T-bar = 33.04
RROA	overall	1.62619	1.81152	-1.05094	5.52642	N = 826
	between		1.75772	-0.75635	5.08206	n = 25
	within		0.86386	-1.38622	6.51327	T-T-bar = 33.04
(2) Explanatory variables - Variables of Interest						
a. Product mix						
Debt-like	overall	0.51246	0.16443	0.20856	0.75865	N = 826
	between		0.14941	0.22992	0.74471	n = 25
	within		0.0819	0.1295	0.73191	T-T-bar = 33.04
PLS	overall	0.04514	0.05577	0	0.18101	N = 825
	between		0.05086	0	0.18101	n = 25
	within		0.02656	-0.0556	0.16965	T-T-bar = 33
Futures	overall	0.01505	0.03073	0	0.10624	N = 826
	between		0.02803	0	0.10619	n = 25
	within		0.00752	-0.00996	0.08769	T-T-bar = 33.04
Sukuk	overall	0.07896	0.06724	0.00536	0.2346	N = 826
	between		0.05914	0.00558	0.22173	n = 25
	within		0.03759	-0.08228	0.21844	T-T-bar = 33.04
b. Measuring diversification						
HHI	overall	0.68039	0.17918	0.26782	1	N = 825
	between		0.16293	0.32190	0.92428	n = 25
	within		0.06951	0.43150	1.19017	T-bar = 33
SE	overall	0.57606	0.29783	0	1.3512	N = 826
	between		0.27029	0.18705	1.22808	n = 25
	within		0.10645	-0.25518	1.03681	T-bar = 33.04

The table presents descriptive statistics of the dependent variables and the variables of interests. *Dependent variables* include return on assets (ROA) = net income/total assets to measure bank profitability. Bank solvency is measured by Z-score = $(ROA_{it} + E/A_{it})/\sigma_{ROA_{it}}$, and risk-adjusted return on assets (RAROA) = ROA divided by the standard deviation of ROA. *Independent variables*: debt-like = Murabaha+ Ijara/total assets, profit-loss sharing = Musharaka + Mudharaba/total assets, futures = Salam + Istisna/total assets, Sukuk = sukuk/total assets. HHI is the Hirschman-Herfindahl Index (HHI) for each bank calculated as in equation IV.13. SE is the Shannon Entropy calculated as in equation IV.14. All variables are calculated for each bank in each quarter. Details of computations and data sources are shown in table IV.2.

Table IV.4.: Descriptive statistics of bank-specific characteristics and macroeconomic factors

Variable		Mean	Std. Dev.	Min	Max	Observations
Size	overall	15.8083	1.13081	13.93143	17.73554	N = 826
	between		1.04613	14.0694	17.69284	n = 25
	within		0.36422	14.44538	16.75207	T-T-bar = 33.04
Liquidity	overall	0.66514	0.25095	0.2252	0.90448	N = 826
	between		0.24673	0.23853	0.89592	n = 25
	within		0.07286	0.16334	1.22503	T-T-bar = 33.04
Total financing	overall	0.68034	0.15674	0.38387	0.95627	N = 826
	between		0.14064	0.39679	0.9547	n = 25
	within		0.08538	0.2743	0.9294	T-T-bar = 33.04
GE	overall	0.14505	0.34138	-0.345	0.67666	N = 826
	between		0.34248	-0.3175	0.59145	n = 25
	within		0.10238	-0.09352	0.36854	T-bar = 33.04
Oil	overall	4.32386	0.37694	3.54211	4.73056	N = 826
	between		0.08349	3.92411	4.36757	n = 25
	within		0.37344	3.49841	5.08816	T-bar = 33.04
GDP Growth	overall	4.15037	3.12899	-2.06	11.96	N = 826
	between		1.40397	2.40937	7.96585	n = 25
	within		2.79	-2.00295	11.371	T-bar = 33.04
ΔCPI	overall	0.00589	0.01169	0	0.03518	N = 779
	between		0.00127	0.00359	0.00811	n = 24
	within		0.01162	-0.00221	0.03748	T-bar = 32.4583

The table presents descriptive statistics of bank-specific characteristics and macroeconomic factors. Size is bank size measured by the natural logarithm of total assets, CAR is bank capital quality measured by the E/A ratio, liquidity is measured by the ratio of total liabilities to total assets, total financing is the aggregate amount of financing assets to total assets, GE is government effectiveness indicator, oil is average quarterly oil prices, GDP growth is calculated as the country's GDP growth, and ΔCPI is the change in inflation measured by consumer price index (CPI).

Table IV.5.: Correlation matrix

	ROA	Z-score	RROA	Debt-like	PLS	Futures	Sukuk	HHI	SE	Size	Liquidity	Total financing	CAR	GE	Oil	GDP Growth	ΔCPI
ROA	1																
Z-score	0.1992	1															
RROA	0.7002	0.7296	1														
Debt-like	0.0993	0.1621	0.2386	1													
PLS	0.0381	0.0871	0.1141	-0.362	1												
Futures	0.0539	-0.1448	-0.0042	-0.334	0.3266	1											
Sukuk	0.0348	-0.0768	-0.0504	0.0835	0.0109	0.0878	1										
HHI	-0.0441	0.3715	0.2131	-0.2245	0.387	0.0661	-0.2896	1									
SE	0.0431	-0.4015	-0.2258	0.0696	-0.1671	0.1366	0.4028	-0.9565	1								
Size	0.2935	0.2312	0.4787	0.2502	0.0352	0.3098	-0.1615	0.0775	-0.0683	1							
Liquidity	-0.2009	-0.2636	-0.1788	0.0173	0.1282	0.3	-0.2432	0.1611	-0.1438	0.1297	1						
Total financing	0.1326	0.1879	0.2832	0.724	0.1118	0.0742	0.4481	0.0135	0.0056	0.2245	0.0781	1					
CAR	0.2187	0.2203	0.0553	-0.3601	0.0606	-0.2706	-0.0046	0.1945	-0.2038	-0.4826	-0.4243	-0.3373	1				
GE	0.2156	0.0786	0.1609	0.319	-0.123	0.066	0.2491	-0.0931	0.0965	0.0985	-0.2253	0.3349	-0.0736	1			
Oil	-0.0734	0.0514	-0.0163	-0.0779	0.0278	0.0189	-0.0188	0.0611	-0.0486	-0.0541	0.0025	-0.0995	0.0701	0.0205	1		
GDP Growth	0.3979	0.1083	0.25	0.0348	0.0511	-0.0929	0.0583	-0.0044	0.0123	-0.0509	-0.2897	0.0451	0.2296	0.2263	0.2813	1	
ΔCPI	0.0241	-0.0291	0.0055	-0.0245	-0.0207	0.0084	0.0002	-0.0074	0.0065	0.0047	0.0403	-0.0275	-0.0276	-0.0704	-0.0595	-0.036	1

The table shows the correlation coefficients of all variables. ROA = net income/total assets to measure bank profitability, Z-score = $(ROA_{it} + E/A_{it})/\sigma_{ROA_{it}}$, RAROA = ROA divided by the standard deviation of ROA. Debt-like = Murabaha+ Ijara/total assets, profit-loss sharing = Musharaka + Mudharaba/total assets, futures = Salam + Istisna/total assets, Sukuk = sukuk/total assets. HHI is the Hirschman-Herfindahl Index (HHI) for each bank calculated as in equation IV.13. SE is the Shannon Entropy calculated as in equation IV.14. Size is bank size measured by the natural logarithm of total assets, CAR is bank capital quality measured by the E/A ratio, liquidity is measured by the ratio of total liabilities to total assets, total financing is the aggregate amount of financing assets to total assets, GE is government effectiveness indicator, oil is average quarterly oil prices, GDP growth is calculated as the country's GDP growth, and ΔCPI is the change in inflation measured by consumer price index (CPI).

Table IV.6.: Descriptive statistics of Islamic banking products by country

VARIABLES	N	mean	sd	min	max
Bahrain					
Murabaha	380	27.48	16.90	0	56.16
Ijarah	380	9.312	10.53	0	37.73
Sukuk	380	11.38	9.855	0.665	46.16
PLS	380	3.572	4.636	0	15.56
Futures	380	0.101	0.262	0	1.204
Number of banks		8			
Number of Obsrv.		281			
% of sample		34			
Saudi Arabia					
Murabaha	120	38.54	24.48	7.606	69.19
Ijarah	120	5.396	8.796	0	24.94
Sukuk	120	3.624	5.529	0.196	18.46
PLS	119	13.16	12.81	0.229	43.86
Futures	120	6.933	10.52	0	31.51
Number of banks		4			
Number of Obsrv.		120			
% of sample		14.5			
Kuwait					
Murabaha	134	48.02	13.61	24.31	69.45
Ijarah	134	8.287	5.562	0	17.49
Sukuk	134	3.901	3.103	0.456	14.96
PLS	134	0	0	0	0
Futures	134	0.838	1.134	0	4.531
Number of banks		4			
Number of Obsrv.		134			
% of sample		16.2			
Qatar					
Murabaha	126	51.76	11.32	31.97	90.06
Ijarah	126	11.55	4.685	3.345	20.69
Sukuk	126	14.36	6.797	3.218	25.99
PLS	126	2.113	3.095	0	12.22
Futures	126	0.555	0.982	0	4.437
Number of banks		4			
Number of Obsrv.		126			
% of sample		15.3			
UAE					
Murabaha	165	32.43	13.04	13.92	69.86
Ijarah	165	24.10	8.788	7.466	42.74
Sukuk	165	6.459	3.759	0.678	13.38
PLS	165	5.901	6.365	0	19.76
Futures	165	3.415	3.899	0	10.30
Number of banks		5			
Number of Obsrv.		165			
% of sample		20			

The table shows the mean, standard deviation, minimum and maximum values of Islamic banking products by country. Murabaha and Ijarah are debt-like products, Sukuk is Islamic investment securities. PLS is profit-loss sharing banking products including Musharakah and Mudharabah. Futures is Islamic future-like banking products including Salam and Istisna contracts.

Table IV.7.: Descriptive statistics of control variables by country

Variable	N	mean	sd	min	max
Bahrain					
Size	281	14.957	0.898	13.480	16.995
Liquidity	281	56.416	23.201	22.877	90.256
Risk	281	0.010	0.004	0.002	0.027
Bank Age	281	17.359	11.458	1.125	36.000
banking System Assets	281	19.135	0.092	19.043	19.346
Interest Rate	281	-0.329	0.637	-0.693	1.386
GDP Growth	281	3.907	1.611	1.500	7.270
Saudi Arabia					
Size	120	16.812	0.837	15.595	18.284
Liquidity	120	82.877	7.774	53.466	90.778
Risk	120	0.033	0.020	0.005	0.061
Bank Age	120	31.958	19.731	4.750	58.250
banking System Assets	120	19.960	0.209	19.518	20.214
Interest Rate	120	0.761	0.240	0.693	1.705
GDP Growth	120	4.026	2.564	-2.060	10.000
Kuwait					
Size	134	15.944	1.247	13.481	17.861
Liquidity	134	83.525	6.173	52.075	90.394
Risk	134	0.018	0.016	0.000	0.044
Bank Age	134	22.897	15.561	1.625	43.250
banking System Assets	134	18.921	0.137	18.684	19.101
Interest Rate	134	0.955	0.346	0.693	1.833
GDP Growth	134	2.474	3.326	-2.370	9.630
Qatar					
Size	126	16.237	0.575	15.265	17.370
Liquidity	126	26.241	10.597	4.992	42.509
Risk	126	0.061	0.036	0.000	0.121
Bank Age	126	19.986	11.485	3.000	33.250
banking System Assets	126	19.103	0.392	18.208	19.588
Interest Rate	126	1.572	0.093	1.504	1.705
GDP Growth	126	8.635	6.175	2.230	19.590
UAE					
Size	165	16.146	1.113	13.171	17.524
Liquidity	165	86.457	7.888	47.972	92.997
Risk	165	0.013	0.011	0.000	0.033
Bank Age	165	15.721	12.407	1.500	40.000
banking System Assets	165	20.027	0.220	19.606	20.346
Interest Rate	165	0.109	0.299	0.000	1.115
GDP Growth	165	3.467	2.490	-5.240	6.360

The table presents the control variables break-down summary statistics by country. Variables definitions are presented in Table IV.2.

Table IV.8.: Estimation output - The effect of Islamic banking products on performance (ROA)

	(1)	(2)	(3)	(4)	(5)
ROA					
Debt	0.00573**				0.00717**
	(0.00273)				(0.00284)
PLS		0.00568			0.00501
		(0.00736)			(0.00751)
Sukuk			0.00189		0.00155
			(0.00653)		(0.00688)
Futures				0.0693***	0.0759***
				(0.0244)	(0.0243)
Size	0.00557***	0.00572***	0.00555***	0.00553***	0.00567***
	(0.000899)	(0.000927)	(0.000916)	(0.00102)	(0.00103)
Liquidity	0.0191***	0.0177***	0.0181***	0.0198***	0.0206***
	(0.00372)	(0.00379)	(0.00367)	(0.00376)	(0.00400)
CAR	0.0709***	0.0665***	0.0668***	0.0698***	0.0750***
	(0.00832)	(0.00820)	(0.00817)	(0.00835)	(0.00851)
GE	0.00151	0.00309	0.00279	0.00250	0.000851
	(0.00212)	(0.00210)	(0.00211)	(0.00205)	(0.00220)
Oil	-0.00323	-0.00323	-0.00322	-0.00315	-0.00325
	(0.00242)	(0.00242)	(0.00241)	(0.00241)	(0.00243)
GDP Growth	0.00106***	0.00110***	0.00113***	0.00117***	0.00110***
	(0.0000848)	(0.0000825)	(0.0000940)	(0.0000831)	(0.0000967)
ΔCPI	-0.0188	-0.0156	-0.0178	-0.0154	-0.0157
	(0.0465)	(0.0465)	(0.0466)	(0.0459)	(0.0458)
Ownership	-0.00478*	-0.00501*	-0.00478*	-0.00389	-0.00393
	(0.00254)	(0.00263)	(0.00260)	(0.00313)	(0.00308)
Arab Spring	-0.00203	-0.00134	-0.00138	-0.000994	-0.00186
	(0.00244)	(0.00248)	(0.00249)	(0.00246)	(0.00240)
2008 Crisis	0.0125	0.0120	0.0116	0.0117	0.0128
	(0.0108)	(0.0108)	(0.0108)	(0.0108)	(0.0109)
N	778	777	778	778	777
R^2					
BIC	-5219.0	-5208.3	-5215.7	-5222.1	-5199.7
F					
chi2	1215.2	1283.6	1294.9	1313.1	1211.1

This table presents the output of estimating the effect of each Islamic product type on bank performance measured by return on assets (ROA). We run the three level mixed model as in equation(IV.1). Variables definitions are presented in table IV.2. We run a regression for each Islamic product separately in (1), (2), (3), and (4). We include all Islamic products in last regression shown in column (5). Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

Table IV.9.: Estimation output - The effect of Islamic banking products on solvency (RROA)

	(1)	(2)	(3)	(4)	(5)
Risk-adjusted ROA					
Debt	2.303***				2.140***
	(0.373)				(0.374)
PLS		0.841			0.164
		(0.950)			(0.930)
Sukuk			-2.112***		-1.245
			(0.760)		(0.758)
Futures				18.05***	17.65***
				(3.871)	(3.737)
Size	0.482***	0.452***	0.569***	0.298*	0.457***
	(0.168)	(0.174)	(0.176)	(0.171)	(0.174)
Liquidity	-0.192	-0.275	-0.218	-0.0483	0.0230
	(0.418)	(0.437)	(0.424)	(0.423)	(0.426)
TF	-4.26e-08***	-2.31e-08**	-2.79e-08***	-2.09e-08**	-4.09e-08***
	(1.04e-08)	(1.02e-08)	(1.01e-08)	(9.86e-09)	(1.02e-08)
CAR	7.529***	6.377***	6.586***	6.801***	7.894***
	(0.994)	(1.005)	(0.997)	(0.992)	(0.987)
Oil	0.0608	0.0489	0.0829	0.0647	0.0814
	(0.176)	(0.180)	(0.178)	(0.177)	(0.174)
GDP Growth	0.0772***	0.0936***	0.0836***	0.105***	0.0828***
	(0.0106)	(0.0105)	(0.0110)	(0.0104)	(0.0110)
ΔCPI	2.367	1.801	3.057	1.333	2.957
	(5.808)	(5.942)	(5.940)	(5.790)	(5.703)
Ownership	0.157	0.198	0.212	0.406	0.311
	(0.732)	(0.743)	(0.738)	(0.813)	(0.768)
Arab Spring	-0.611*	-0.346	-0.303	-0.144	-0.435
	(0.339)	(0.344)	(0.342)	(0.341)	(0.334)
2008 Crisis	-1.000	-1.178	-1.109	-1.123	-0.881
	(0.757)	(0.775)	(0.765)	(0.763)	(0.750)
N	778	777	778	778	777
BIC	2122.3	2156.9	2151.9	2139.4	2117.5
F					
chi2	769.4	707.5	715.0	795.0	832.2

This table presents the output of estimating the effect of each Islamic product type on bank solvency measured by risk-adjusted return on assets (RAROA). We run the three level mixed model as in equation(IV.1). Variables definitions are presented in table IV.2. We run a regression for each Islamic product separately in (1), (2), (3), and (4). We include all Islamic products in last regression shown in column (5). Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

Table IV.10.: Estimation output - The effect of Islamic banking products on solvency (Z-score)

	(1)	(2)	(3)	(4)	(5)
Z-Score					
Debt	-8.446***				-9.262***
	(1.904)				(1.994)
PLS		8.854**			10.38**
		(4.451)			(4.744)
Sukuk			-0.555		-6.550*
			(3.502)		(3.764)
Futures				-2.278	2.872
				(19.84)	(19.43)
Size	-5.493***	-6.126***	-6.268***	-6.280***	-5.043***
	(0.738)	(0.723)	(0.748)	(0.731)	(0.769)
Liquidity	-19.39***	-15.01***	-16.37***	-16.28***	-18.37***
	(1.962)	(1.919)	(1.935)	(1.935)	(1.955)
TF	1.82e-08***	1.57e-08***	1.53e-08***	1.53e-08***	1.94e-08***
	(5.41e-08)	(5.44e-08)	(5.44e-08)	(5.43e-08)	(5.45e-08)
GE	4.730***	3.986***	4.296***	4.248***	5.037***
	(1.497)	(1.493)	(1.515)	(1.497)	(1.526)
Oil	-0.560	-0.502	-0.451	-0.458	-0.533
	(0.362)	(0.350)	(0.360)	(0.358)	(0.359)
GDP Growth	0.112**	0.0901*	0.0979*	0.0978*	0.0949*
	(0.0503)	(0.0490)	(0.0504)	(0.0502)	(0.0501)
ΔCPI	0.0135	-0.0284	0.00460	0.00243	-0.00727
	(0.0473)	(0.0465)	(0.0468)	(0.0469)	(0.0477)
Ownership	8.204	8.065	8.435	8.413	7.743
	(8.646)	(8.736)	(8.727)	(8.728)	(8.634)
Arab Spring	-0.992***	-0.785**	-0.808**	-0.826**	-0.795**
	(0.362)	(0.349)	(0.361)	(0.356)	(0.366)
2008 Crisis	0.363	0.541	0.539	0.539	0.404
	(0.462)	(0.446)	(0.456)	(0.457)	(0.456)
N	825	824	825	825	824
R^2					
BIC	4787.5	4795.0	4803.1	4803.2	4797.1
F					
chi2	809.2	787.9	777.4	776.4	818.8

The table presents the output of estimating the effect of each Islamic product type on bank solvency measured by Z-score. We run the three level mixed model as in equation(IV.1). Variables definitions are presented in table IV.2. We run a regression for each Islamic product separately in (1), (2), (3), and (4). We include all Islamic products in last regression shown in column (5). Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

Table IV.11.: Estimation output - The effect of Islamic banking products on performance and solvency (country effects)

Product	Country Effect				
	BAH	KSA	KUW	QAT	UAE
Panel A: ROA					
Debt	-0.0133	0.0255	0.00956**	-0.0246***	0.0324***
	(0.00907)	(0.0156)	(0.00444)	(0.00424)	(0.00484)
PLS	-0.112***	0.0364	.	-0.0396***	0.0131
	(0.0205)	(0.0249)	(0)	(0.0134)	(0.0113)
Sukuk	0.0394***	0.0205	-0.148***	-0.0256***	-0.00282
	(0.0146)	(0.0210)	(0.0319)	(0.00869)	(0.0207)
Futures	0.683	0.00836	0.0597	0.130***	0.162***
	(0.436)	(0.0787)	(0.0468)	(0.0500)	(0.0403)
Observations	777				
chi2	1955.0				
Panel B: Risk-Adjusted ROA					
Debt	2.413***	3.694	1.606***	-0.278	4.528***
	(0.934)	(2.363)	(0.567)	(0.649)	(0.757)
PLS	-2.968*	1.620	0	-4.662***	2.659
	(1.743)	(3.661)	(.)	(1.744)	(1.921)
Sukuk	1.000	2.392	-18.34***	-4.093***	1.482
	(1.242)	(2.924)	(4.311)	(1.075)	(3.631)
Futures	25.25	-0.0538	13.55**	18.37***	23.21***
	(39.30)	(15.73)	(5.965)	(6.763)	(7.148)
Observations	777				
chi2	1102.5				
Panel C: Z-score					
Debt	-6.381	11.18**	-12.70***	-11.60***	-23.47***
	(4.613)	(4.788)	(2.997)	(4.262)	(4.501)
PLS	25.81***	9.034	0	34.43**	-79.35***
	(9.031)	(6.634)	(.)	(13.95)	(11.15)
Sukuk	-17.95***	-7.966	68.69***	-24.36***	-39.16*
	(6.321)	(5.775)	(24.45)	(7.453)	(20.36)
Futures	-58.68	228.0**	55.47	82.26	-65.24
	(36.29)	(100.5)	(34.17)	(55.19)	(42.89)
Observations	824				
chi2	1230.3				

This table presents the output of estimating the effect of each Islamic product type on bank performance and solvency taking into consideration country effects. We re-estimate equation IV.1 by adding an interaction term of each Islamic product by country dummy variable. Variables definitions are presented in table IV.2. *country.dummy* is a dummy variable that takes a values from 1 to 5 representing the five GCC countries: 1= BAH= Bahrain, 2= KSA=Saudi Arabia, 3= KUW= Kuwait, 4= QAT= Qatar, 5= UAE= Emirates. In panel A we show the effect of each Islamic banking product on bank performance measured by return on assets (ROA) in each country. In panel B we show the effect of each Islamic banking product on bank solvency measured by risk-adjusted return on assets (RAROA) in each country. In panel C we show the effect of each Islamic banking product on bank solvency measured by Z-score in each country. Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

Table IV.12.: Estimation output - The effect of portfolio diversification on bank performance (ROA)

	(1)	(2)	(3)	(D)	(5)	(6)	(7)	(8)
ROA								
HHI	-0.000219***	-0.000223***	-0.00683***	0.0000444				
	(0.0000603)	(0.0000602)	(0.000952)	(0.0000709)				
SE					0.000604***	0.000667***	0.0136***	-0.0000533
					(0.000167)	(0.000166)	(0.00411)	(0.000185)
Size	0.00455***	0.00450***	0.00352***	0.00408***	0.00438***	0.00420***	0.00428***	0.00408***
	(0.000508)	(0.000498)	(0.000460)	(0.000489)	(0.000506)	(0.000492)	(0.000488)	(0.000485)
CAR	0.0309***	0.0305***	0.0222***	0.0258***	0.0310***	0.0311***	0.0268***	0.0271***
	(0.00591)	(0.00591)	(0.00445)	(0.00517)	(0.00597)	(0.00603)	(0.00569)	(0.00530)
Liquidity	0.00196	0.00183	0.00169	0.00179	0.00203	0.00135	0.00158	0.00178
	(0.00132)	(0.00130)	(0.00129)	(0.00127)	(0.00131)	(0.00129)	(0.00130)	(0.00126)
GDP Growth	0.0000726	0.0000876	0.000151**	0.000252***	0.0000779	0.000108*	0.0000768	0.000180***
	(0.0000640)	(0.0000646)	(0.0000626)	(0.0000751)	(0.0000643)	(0.0000650)	(0.0000611)	(0.0000666)
Ownership	-0.00138				-0.00103			
	(0.00139)				(0.00141)			
Arab Spring	-0.00128***	-0.00126***	-0.00117***	-0.00118***	-0.00132***	-0.00121***	-0.00105***	-0.00117***
	(0.000407)	(0.000408)	(0.000391)	(0.000381)	(0.000409)	(0.000411)	(0.000383)	(0.000381)
2008 Crisis	0.000659	0.000595	0.000782	0.000352	0.000600	0.000570	0.000731	0.000297
	(0.000618)	(0.000616)	(0.000621)	(0.000614)	(0.000617)	(0.000618)	(0.000618)	(0.000614)
HHI× Ownership[a]		0.000759						
		(0.000531)						
HHI× Size			0.000410***					
			(0.0000591)					
HHI× GDP Growth				-0.0000385***				
				(0.00000814)				
SE× Ownership[b]						-0.00233*		
						(0.00134)		
SE× Size							-0.000810***	
							(0.000256)	
SE× GDP Growth								0.000101***
								(0.0000212)
N	778	778	778	778	778	778	778	778
chi2	901.6	873.0	5543.8	1353.0	951.5	854.0	825.1	1361.0

This table presents the output of estimating the effect of Islamic bank asset portfolio on bank performance measured by return on assets (ROA). We run a Feasible Generalized Least Squares (FGLS) regression as in equation (IV.2). In column (1) we estimate the effect of concentration measured by the Hirschman-Herfindahl Index (HHI). We re-estimate the model by adding interaction terms between the concentration measure and an ownership dummy in equation (IV.3) (column (2)), bank size in equation (IV.4) (column (3)), and GDP growth in equation (IV.5) (column (4)). We run the same specifications in columns (5)-(8) by using the Shannon Entropy (SE) as a measure for bank portfolio concentration. Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

[a] private bank =1, state-owned=0

[b] private bank =1, state-owned=0

Table IV.13.: Estimation output - The effect of portfolio diversification on bank solvency (RAROA)

	(1)	(2	(3)	(4)	(5)	(6)	(7)	(8)
RAROA								
HHI	0.0253	0.00627	-2.294***	0.0288				
	(0.0222)	(0.0227)	(0.444)	(0.0235)				
SE					-0.0936*	-0.0507	0.998	-0.0993
					(0.0559)	(0.0626)	(1.226)	(0.0629)
Size	0.798***	0.762***	0.711***	0.749***	0.822***	0.784***	0.824***	0.770***
	(0.0641)	(0.0666)	(0.0745)	(0.0662)	(0.0638)	(0.0660)	(0.0701)	(0.0659)
CAR	1.544**	1.553**	2.738***	1.490**	1.562**	1.606**	1.735***	1.495**
	(0.635)	(0.634)	(0.656)	(0.628)	(0.631)	(0.629)	(0.661)	(0.626)
Liquidity	-0.0793	-0.0609	-0.104	-0.0654	-0.125	-0.115	-0.112	-0.0461
	(0.227)	(0.232)	(0.233)	(0.232)	(0.225)	(0.231)	(0.232)	(0.230)
GDP Growth	0.00577	0.00621	0.00643	0.0155*	0.00565	0.00582	0.00367	0.00336
	(0.00719)	(0.00732)	(0.00742)	(0.00895)	(0.00721)	(0.00733)	(0.00721)	(0.00732)
Ownership	-0.452***				-0.404***			
	(0.158)				(0.153)			
Arab Spring	-0.0529	-0.0520	-0.0631	-0.0512	-0.0516	-0.0509	-0.0508	-0.0515
	(0.0472)	(0.0471)	(0.0480)	(0.0470)	(0.0471)	(0.0471)	(0.0469)	(0.0470)
2008 Crisis	0.0295	0.0390	0.0424	0.0377	0.0374	0.0424	0.0430	0.0418
	(0.0649)	(0.0648)	(0.0655)	(0.0649)	(0.0651)	(0.0651)	(0.0648)	(0.0650)
HHI× Ownership[a]		0.0700						
		(0.0527)						
HHI× Size			0.148***					
			(0.0278)					
HHI× GDP Growth				-0.00571*				
				(0.00294)				
SE× Ownership[b]						-0.108		
						(0.125)		
SE× Size							-0.0687	
							(0.0776)	
SE× GDP Growth								0.0122
								(0.00806)
N	778	778	778	778	778	778	778	778
chi2	354.0	293.5	427.1	289.8	370.6	313.2	309.9	297.8

This table presents the output of estimating the effect of Islamic bank asset portfolio on bank solvency measured by risk-adjusted return on assets (RAROA). We run a Feasible Generalized Least Squares (FGLS) regression as in equation (IV.2). In column (1) we estimate the effect of concentration measured by the Hirschman-Herfindahl Index (HHI). We re-estimate the model by adding interaction terms between the concentration measure and an ownership dummy in equation (IV.3) (column (2)), bank size in equation (IV.4) (column (3)), and GDP growth in equation (IV.5) (column (4)). We run the same specifications in columns (5)-(8) by using the Shannon Entropy (SE) as a measure for bank portfolio concentration. Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

[a] private bank =1, state-owned=0

[b] private bank =1, state-owned=0

Table IV.14.: Estimation output - The effect of portfolio diversification on bank solvency (Z-score)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Z-score								
HHI	0.249**	0.630***	5.994**	0.263**				
	(0.119)	(0.203)	(2.958)	(0.123)				
SE					-1.106***	-1.367***	-4.821	-1.083***
					(0.300)	(0.437)	(7.064)	(0.332)
Size	2.432***	2.508***	2.590***	2.439***	3.084***	3.072***	2.898***	3.128***
	(0.228)	(0.218)	(0.288)	(0.229)	(0.206)	(0.203)	(0.216)	(0.205)
Liquidity	-4.862***	-5.515***	-3.558***	-4.882***	-5.037***	-5.257***	-4.053***	-5.132***
	(1.249)	(1.222)	(1.259)	(1.252)	(1.275)	(1.273)	(1.274)	(1.280)
Oil	0.0830	0.0107	0.0277	0.0837	0.0462	0.0302	0.0882	0.0347
	(0.197)	(0.193)	(0.192)	(0.197)	(0.207)	(0.206)	(0.202)	(0.208)
TF	-0.699	-0.509	-0.809	-0.690	-0.508	-0.486	-0.108	-0.456
	(0.822)	(0.780)	(0.800)	(0.829)	(0.932)	(0.898)	(0.922)	(0.937)
ΔCPI	-0.432	-1.107	-0.275	-0.457	0.238	0.187	-0.339	0.131
	(2.322)	(2.269)	(2.220)	(2.339)	(2.501)	(2.463)	(2.474)	(2.516)
GE	1.596	1.342	2.336**	1.589	2.098**	2.157**	2.236**	2.012**
	(0.990)	(0.975)	(0.959)	(0.996)	(0.996)	(0.986)	(1.026)	(1.006)
GDP Growth	0.0265	0.0248	0.0261	0.0102	0.00268	0.00677	0.00903	0.00636
	(0.0275)	(0.0272)	(0.0265)	(0.0404)	(0.0290)	(0.0289)	(0.0290)	(0.0298)
Ownership	-3.907***	-4.622***	-5.638***	-3.958***	-4.032***	-4.176***	-4.210***	-3.983***
	(0.751)	(0.809)	(0.816)	(0.749)	(0.725)	(0.719)	(0.770)	(0.725)
Arab Spring	-0.0529	-0.0285	-0.0754	-0.0553	-0.149	-0.137	-0.102	-0.152
	(0.185)	(0.178)	(0.176)	(0.186)	(0.196)	(0.193)	(0.193)	(0.197)
2008 Crisis	-0.0535	0.0325	-0.0131	-0.0675	0.0215	0.0659	0.0361	0.0223
	(0.275)	(0.271)	(0.272)	(0.277)	(0.283)	(0.283)	(0.276)	(0.284)
HHI× Ownership[a]		-0.511**						
		(0.256)						
HHI× Size			-0.363*					
			(0.188)					
HHI× GDP Growth				0.00968				
				(0.0175)				
SE× Ownership[b]						0.472		
						(0.597)		
SE× Size							0.221	
							(0.448)	
SE× GDP Growth								-0.0327
								(0.0481)
N	753	753	753	753	753	753	753	753
chi2	3653.4	5221.2	2521.7	3652.4	5328.0	5769.7	5671.5	5466.5

This table presents the output of estimating the effect of Islamic bank asset portfolio on bank solvency measured by Z-score. We run a Feasible Generalized Least Squares (FGLS) regression as in equation (IV.2). In column (1) we estimate the effect of concentration measured by the Hirschman-Herfindahl Index (HHI). We re-estimate the model by adding interaction terms between the concentration measure and an ownership dummy in equation (IV.3) (column (2)), bank size in equation (IV.4) (column (3)), and GDP growth in equation (IV.5) (column (4)). We run the same specifications in columns (5)-(8) by using the Shannon Entropy (SE) as a measure for bank portfolio concentration. Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

[a] private bank =1, state-owned=0

[b] private bank =1, state-owned=0

Table IV.15.: Estimation output -The effect of portfolio diversification on bank performance (ROE)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
ROE								
HHI	-0.00285***	-0.00305***	-0.00276	-0.00201***				
	(0.000406)	(0.000400)	(0.0107)	(0.000610)				
SE					0.00757***	0.00848***	0.00417	0.00477***
					(0.00104)	(0.00107)	(0.0343)	(0.00143)
Size	0.0339***	0.0338***	0.0352***	0.0326***	0.0332***	0.0331***	0.0345***	0.0320***
	(0.00328)	(0.00325)	(0.00326)	(0.00324)	(0.00326)	(0.00324)	(0.00306)	(0.00321)
CAR	0.00533	0.0102	0.0351	-0.00972	0.00594	0.0198	0.0381	-0.0149
	(0.0353)	(0.0354)	(0.0364)	(0.0346)	(0.0351)	(0.0359)	(0.0370)	(0.0340)
Liquidity	0.00903	0.00719	0.00586	0.00540	0.00906	0.00375	0.00544	0.00527
	(0.00994)	(0.00987)	(0.00999)	(0.00998)	(0.00984)	(0.00984)	(0.00995)	(0.00987)
GDP Growth	0.000342	0.000419	0.000405	0.000755*	0.000323	0.000440	0.000315	0.000554
	(0.000373)	(0.000377)	(0.000385)	(0.000435)	(0.000370)	(0.000378)	(0.000371)	(0.000386)
Ownership	-0.0101				-0.00780			
	(0.00828)				(0.00838)			
Arab Spring	-0.00573**	-0.00579**	-0.00596**	-0.00515**	-0.00576**	-0.00568**	-0.00574**	-0.00490**
	(0.00249)	(0.00250)	(0.00253)	(0.00252)	(0.00246)	(0.00249)	(0.00245)	(0.00247)
2008 Crisis	0.00245	0.00225	0.00241	0.00227	0.00231	0.00192	0.00212	0.00211
	(0.00407)	(0.00406)	(0.00409)	(0.00412)	(0.00406)	(0.00404)	(0.00404)	(0.00411)
HHI× Ownership[a]		0.00472						
		(0.00345)						
HHI× Size			-0.0000249					
			(0.000662)					
HHI× GDP Growth				-0.000119*				
				(0.0000677)				
SE × Ownership[b]						-0.0108		
						(0.00815)		
SE× Size							0.0000396	
							(0.00214)	
SE× GDP Growth								0.000363**
								(0.000158)
N	778	778	778	778	778	778	778	778
chi2	908.2	910.8	883.5	943.0	942.8	863.9	713.7	1021.5

This table presents the output of estimating the effect of Islamic bank asset portfolio on bank performance measured by return on equity (ROE). We run a Feasible Generalized Least Squares (FGLS) regression as in equation (IV.2). In column (1) we estimate the effect of concentration measured by the Hirschman-Herfindahl Index (HHI). We re-estimate the model by adding interaction terms between the concentration measure and an ownership dummy in equation (IV.3) (column (2)), bank size in equation (IV.4) (column (3)), and GDP growth in equation (IV.5) (column (4)). We run the same specifications in columns (5)-(8) by using the Shannon Entropy (SE) as a measure for bank portfolio concentration. Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

[a] private bank =1, state-owned=0

[b] private bank =1, state-owned=0

Table IV.16.: Estimation output - The effect of portfolio diversification on bank solvency (RAROE)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
RAROE								
HHI	-0.0210	-0.0260*	-1.407***	0.000692				
	(0.0137)	(0.0135)	(0.323)	(0.0133)				
SE					0.0409	0.0571	1.117	0.00743
					(0.0384)	(0.0373)	(0.978)	(0.0357)
Size	0.923***	0.858***	0.774***	0.827***	0.917***	0.834***	0.847***	0.818***
	(0.0723)	(0.0727)	(0.0756)	(0.0740)	(0.0717)	(0.0734)	(0.0730)	(0.0723)
CAR	0.730	0.676	0.920	0.503	0.686	0.718	0.525	0.484
	(0.693)	(0.689)	(0.671)	(0.693)	(0.697)	(0.688)	(0.697)	(0.693)
GDP Growth	0.00580	0.00710	0.00399	0.0158*	0.00645	0.00603	0.00541	0.00526
	(0.00716)	(0.00712)	(0.00697)	(0.00821)	(0.00722)	(0.00713)	(0.00713)	(0.00710)
Liquidity	-1.332***	-1.294***	-1.217***	-1.222***	-1.361***	-1.185***	-1.244***	-1.185***
	(0.314)	(0.313)	(0.311)	(0.316)	(0.315)	(0.313)	(0.314)	(0.315)
Ownership	-0.873***				-0.867***			
	(0.209)				(0.207)			
Arab Spring	-0.0490	-0.0444	-0.0477	-0.0446	-0.0522	-0.0427	-0.0495	-0.0468
	(0.0422)	(0.0415)	(0.0408)	(0.0417)	(0.0426)	(0.0415)	(0.0419)	(0.0416)
2008 Crisis	0.125	0.125	0.134*	0.122	0.123	0.123	0.115	0.120
	(0.0770)	(0.0772)	(0.0773)	(0.0771)	(0.0774)	(0.0769)	(0.0779)	(0.0772)
HHI× Ownership[a]		0.122**						
		(0.0584)						
HHI× Size			0.0863***					
			(0.0201)					
HHI× GDP Growth				-0.00486***				
				(0.00162)				
SE× Ownership[b]						-0.147		
						(0.145)		
SE× Size							-0.0669	
							(0.0611)	
SE× GDP Growth								0.0114***
								(0.00425)
N	778	778	778	778	778	778	778	778
chi2	410.8	367.1	412.3	332.5	417.0	353.4	350.8	342.5

This table presents the output of estimating the effect of Islamic bank asset portfolio on bank solvency measured by risk-adjusted return on equity (RAROE). We run a Feasible Generalized Least Squares (FGLS) regression as in equation (IV.2). In column (1) we estimate the effect of concentration measured by the Hirschman-Herfindahl Index (HHI). We re-estimate the model by adding interaction terms between the concentration measure and an ownership dummy in equation (IV.3) (column (2)), bank size in equation (IV.4) (column (3)), and GDP growth in equation (IV.5) (column (4)). We run the same specifications in columns (5)-(8) by using the Shannon Entropy (SE) as a measure for bank portfolio concentration. Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

[a] private bank =1, state-owned=0

[b] private bank =1, state-owned=0

Table IV.17.: Robustness check- Asset portfolio diversification, bank size and performance

Marginal effects of the proportion of each banking product on banking performance ROA							
Debt-like	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	0.0080685	0.0036555	2.21	0.027	0.0009037	0.0152332
	Medium	0.0077014	0.0027666	2.78	0.005	0.0022788	0.0131239
PLS	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-0.0026117	0.012895	-0.2	0.839	-0.0278855	0.0226621
	Medium	0.00065	0.0094545	0.07	0.945	-0.0178805	0.0191805
	Large	0.0347108	0.0131715	2.64	0.008	0.0088951	0.0605265
Sukuk	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-0.0004989	0.0144864	-0.03	0.973	-0.0288917	0.0278938
	Medium	-0.0037909	0.007426	-0.51	0.61	-0.0183456	0.0107638
	Large	-0.0224943	0.0121193	-1.86	0.063	-0.0462477	0.0012591
Futures	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-0.0186137	1.632755	-0.01	0.991	-3.218754	3.181527
	Medium	0.1109717	0.0323654	3.43	0.001	0.0475367	0.1744068
	Large	0.1040744	0.0316267	3.29	0.001	0.0420872	0.1660615
Marginal effects of the proportion of each banking product on banking solvency RROA							
Debt-like	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-0.0183412	0.7069789	-0.03	0.979	-1.403994	1.367312
	Medium	0.2683475	0.6084418	0.44	0.659	-0.9241765	1.460872
	Large	-0.7423338	0.712162	-1.04	0.297	-2.138146	0.653478
PLS	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-3.958551	1.70608	-2.32	0.02	-7.302407	-0.614695
	Medium	-1.325962	1.251806	-1.06	0.289	-3.779458	1.127533
	Large	5.635024	1.770997	3.18	0.001	2.163933	9.106115
Sukuk	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-2.357484	1.252854	-1.88	0.06	-4.813032	0.0980646
	Medium	-3.825792	1.010878	-3.78	0	-5.807076	-1.844507
	Large	-4.138113	1.779522	-2.33	0.02	-7.625913	-0.6503138
Futures	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-48.41926	125.9819	-0.38	0.701	-295.3393	198.5007
	Medium	19.0828	5.119973	3.73	0	9.047842	29.11777
	Large	15.06447	4.400832	3.42	0.001	6.439	23.68995
Marginal effects of the proportion of each banking product on banking solvency Z-score							
Debt-like	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	-2.095956	3.383548	-0.62	0.536	-8.727588	4.535677
	Medium	3.125995	2.840983	1.1	0.271	-2.44223	8.69422
	Large	4.048633	3.530607	1.15	0.251	-2.871228	10.9685
PLS	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	0.8409119	9.146818	0.09	0.927	-17.08652	18.76835
	Medium	16.54143	5.458594	3.03	0.002	5.842779	27.24008
	Large	37.16898	5.922113	6.28	0	25.56185	48.77611
Sukuk	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	11.08733	5.959924	1.86	0.063	-0.5939105	22.76856
	Medium	8.949741	4.428356	2.02	0.043	0.2703231	17.62916
	Large	-20.23886	11.72903	-1.73	0.084	-43.22732	2.749613
Futures	Bank Size	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
	Small	37.51265	36.88281	1.02	0.309	-34.77634	109.8016
	Medium	17.27469	27.18545	0.64	0.525	-36.00782	70.5572
	Large	25.56202	24.65269	1.04	0.3	-22.75637	73.88041

The table present the marginal effects of banking product proportion on bank performance and solvency with respect to bank size

Table IV.18.: Robustness check - The effect of income portfolio on bank performance (ROA)

	(1) ROA				(2) RROA				(3) Z-score			
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
HHI	-0.000557	-0.000943	-0.0229*	-0.00273*	-0.0222	-0.117	-3.439**	-0.218	0.0533	0.113	5.366	-0.172
	(0.000976)	(0.00117)	(0.0124)	(0.00157)	(0.111)	(0.129)	(1.418)	(0.172)	(0.349)	(0.424)	(4.029)	(0.482)
Size	0.00413***	0.00395***	0.00374***	0.00405***	0.810***	0.781***	0.810***	0.824***	2.858***	2.825***	3.031***	3.017***
	(0.000493)	(0.000488)	(0.000503)	(0.000483)	(0.0665)	(0.0674)	(0.0622)	(0.0681)	(0.193)	(0.192)	(0.189)	(0.195)
CAR	0.0210***	0.0207***	0.0278***	0.0204***	1.824***	1.768***	2.265***	2.006***				
	(0.00522)	(0.00514)	(0.00602)	(0.00508)	(0.650)	(0.650)	(0.688)	(0.650)				
Liquidity	0.00273**	0.00272**	0.00158	0.00263**	0.0913	0.0627	-0.313	0.0159	-6.851***	-5.790***	-8.566***	-7.642***
	(0.00135)	(0.00132)	(0.00131)	(0.00127)	(0.231)	(0.232)	(0.218)	(0.230)	(1.084)	(1.071)	(1.032)	(1.107)
GDP Growth	0.0000848	0.0000861	0.000171**	-0.000178	0.00244	0.00251	0.00734	-0.0194	-0.0115	-0.0257	0.0140	-0.0419
	(0.0000674)	(0.0000674)	(0.0000703)	(0.000168)	(0.00711)	(0.00719)	(0.00802)	(0.0164)	(0.0271)	(0.0280)	(0.0217)	(0.0623)
Ownership	-0.00121				-0.495***				-1.509***	-1.348*	-2.094***	-1.279***
	(0.00131)				(0.176)				(0.449)	(0.718)	(0.443)	(0.454)
Arab Spring	-0.00151***	-0.00148***	-0.00140***	-0.00149***	-0.0509	-0.0495	-0.0646	-0.0515	-0.0763	-0.0932	0.0592	-0.118
	(0.000429)	(0.000430)	(0.000441)	(0.000429)	(0.0463)	(0.0466)	(0.0509)	(0.0467)	(0.185)	(0.192)	(0.121)	(0.186)
2008 Crisis	0.000966	0.000909	0.000982	0.000800	0.0314	0.0220	0.0584	0.0413	0.0472	0.0431	0.0643	0.0930
	(0.000643)	(0.000645)	(0.000658)	(0.000634)	(0.0649)	(0.0654)	(0.0696)	(0.0656)	(0.267)	(0.265)	(0.272)	(0.266)
HHI× Ownership[a]		0.000762				0.270				0.433		
		(0.00139)				(0.183)				(0.868)		
HHI× Size			0.00139*				0.217**				-0.324	
			(0.000766)				(0.0897)				(0.248)	
HHI× GDP Growth				0.000438*				0.0373				0.0424
				(0.000244)				(0.0250)				(0.0958)
GE									-0.884	-0.131	-0.627	-1.206
									(0.817)	(0.893)	(0.626)	(0.835)
Oil									0.0912	0.153	0.123	0.0198
									(0.188)	(0.193)	(0.138)	(0.190)
TF									-0.602	-0.896	0.294	-0.732
									(0.873)	(0.924)	(0.838)	(0.854)
Δ CPI									-0.558	-1.021	0.953	-0.611
									(2.233)	(2.331)	(1.484)	(2.257)
N	778	778	778	778	778	778	778	778	753	753	753	753
chi2	926.8	913.6	898.0	911.8	334.5	303.7	678.6	326.1	11941.0	13722.2	13201.9	11253.0

This table presents the output of estimating the effect of Islamic bank income portfolio on bank performance (ROA) and solvency(risk-adjusted return on assets (RROA) and Z-score). We run a Feasible Generalized Least Squares (FGLS) regression as in equation (IV.2-IV.5). In column (1) we estimate the effect of concentration measured by the Hirschman-HerfindahlIndex (HHI) on bank performance, and on solvency in columns (2) and (3). We re-estimate the model by adding interaction terms between the concentration measure and an ownership dummy in equation (IV.3), bank size in equation (IV.4), and GDP growth in equation (IV.5). Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

[a] private bank =1, state-owned=0

Table IV.19.: Robustness check: Dynamic GMM estimation output (Product mix)

	(1) ROA	(2) RROA
L.ROA	0.391**	
	(0.180)	
L.RROA		1.010***
		(0.186)
PLS	-0.135	-0.121
	(0.182)	(0.123)
Debt-like	-0.140**	0.0397
	(0.0601)	(0.0286)
Sukuk	-0.0579	-0.135**
	(0.0798)	(0.0581)
Futures	2.054***	-0.184
	(0.740)	(0.328)
Size	0.00389	0.000847
	(0.00478)	(0.00212)
CAR	0.0898*	0.149***
	(0.0464)	(0.0361)
ΔCPI	0.131**	0.0291
	(0.0513)	(0.0311)
GDP Growth	-0.00119*	0.000674
	(0.000689)	(0.000433)
Arab Spring	0.000631	0.00167
	(0.00420)	(0.00218)
N	873	873
chi2	2368.5	11885.7

The table present the output of the dynamic GMM estimation of EquationIV.15. We estimate the impact of each funding instrument on banks' performance (ROA) and solvency (RROA). Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1), ** (p0.05), *** (p0.01)

Table IV.20.: Robustness check - Dynamic GMM estimation output (Asset portfolio diversification)

	ROA		RROA	
L.ROA	0.380*	0.457**		
	(0.215)	(0.180)		
L.RROA			0.800***	0.830***
			(0.132)	(0.136)
HHI	-0.0181*		0.00223	
	(0.00969)		(0.00137)	
SE		0.0246		-0.00673*
		(0.0164)		(0.00345)
Size	0.0385	0.0346	-0.0301***	-0.0289***
	(0.0275)	(0.0237)	(0.00819)	(0.00833)
Liquidity	0.102	0.109*		
	(0.0680)	(0.0586)		
CAR	0.193*	0.197**	0.0153	0.0182
	(0.106)	(0.0915)	(0.0435)	(0.0442)
ΔCPI	0.0960	0.106**	-0.0144	-0.0125
	(0.0621)	(0.0538)	(0.0244)	(0.0248)
GDP Growth	-0.000947	-0.000860	0.000331	0.000378
	(0.000742)	(0.000675)	(0.000275)	(0.000281)
Arab Spring	0.000722	-0.000344	-0.00182	-0.00191
	(0.00397)	(0.00353)	(0.00153)	(0.00150)
Ownership	-0.734	-0.786	0.731***	0.703***
	(0.609)	(0.529)	(0.184)	(0.189)
N	873	874	873	874
chi2	1708.9	2285.1	19527.0	18945.2

The table present the output of the dynamic GMM estimation of Equation IV.15. We estimate the impact of asset diversification on banks' performance (ROA) and solvency (RROA). Variables definitions are shown in table IV.2. Standard errors in parentheses. Significance levels are shown as * (p0.1),** (p0.05), *** (p0.01)

II. Figures

Figure IV.1.: The ROA Variation Between and Within Countries

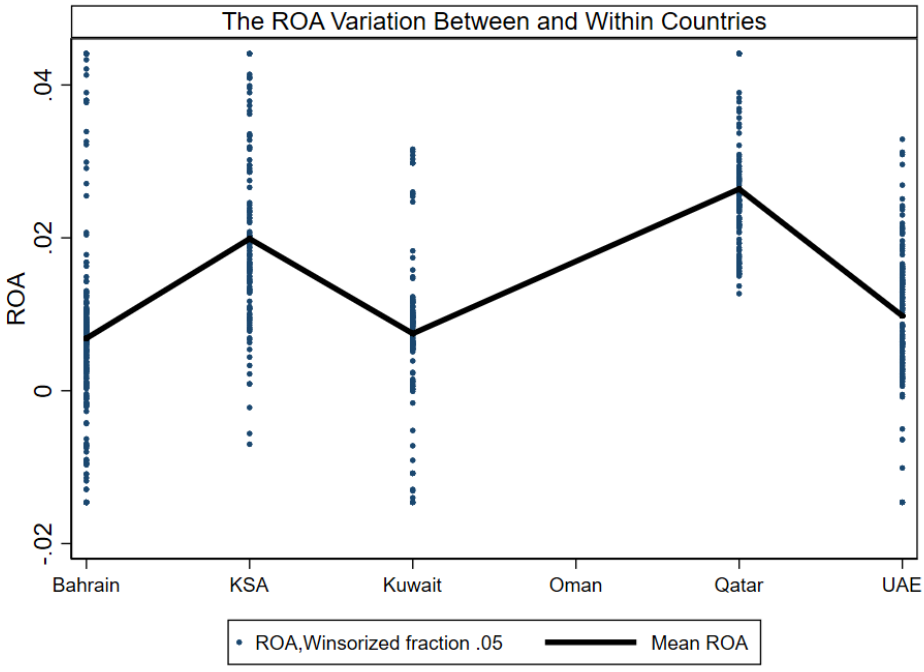


Figure IV.2.: The ROA Variation Between and Within Banks

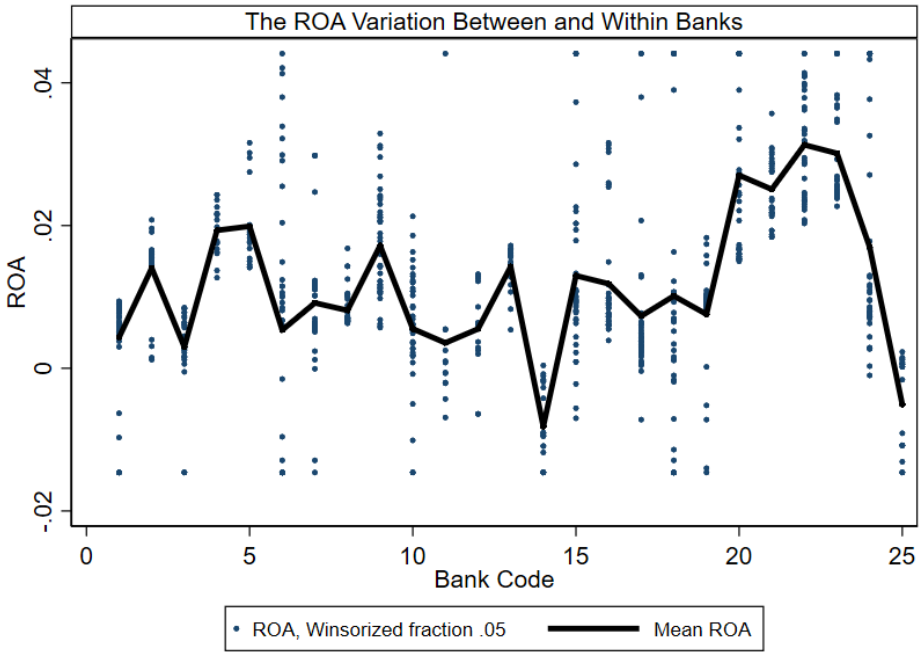


Figure IV.3.: The ROA Variation Between and Within Periods

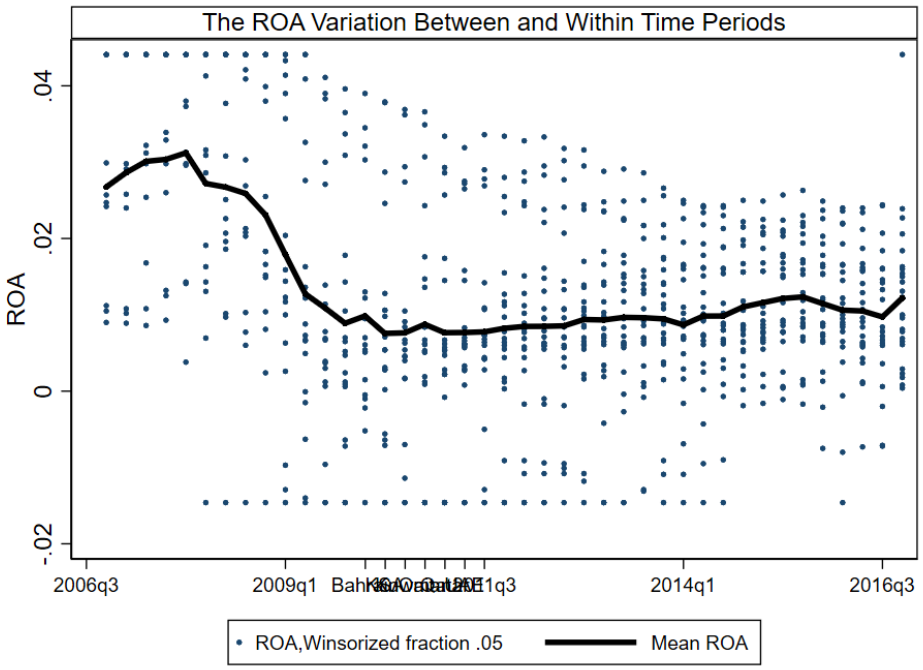


Figure IV.4.: Aggregated Total Islamic Banking Assets as of December 2016 - USD'000

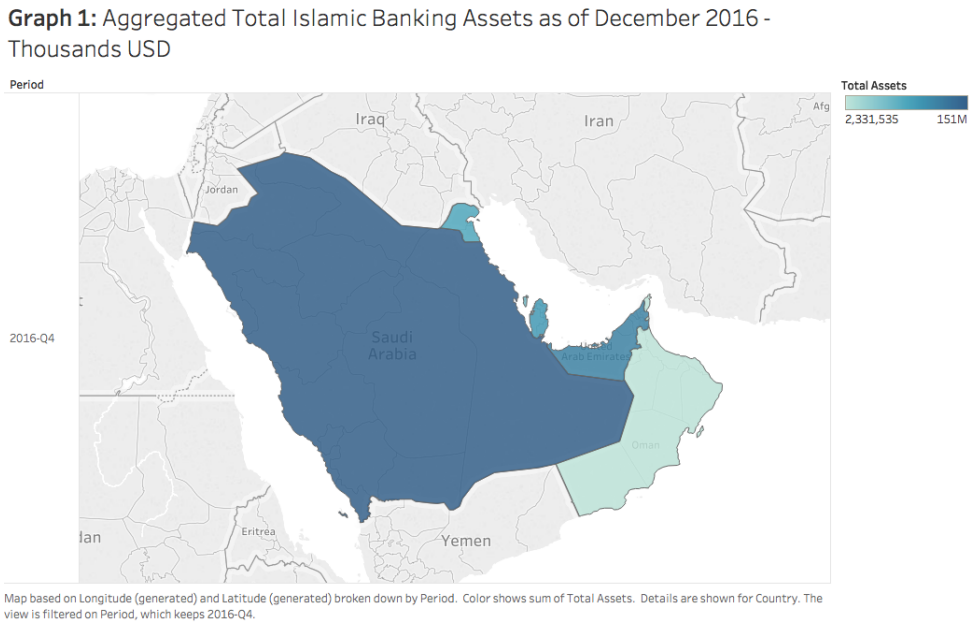
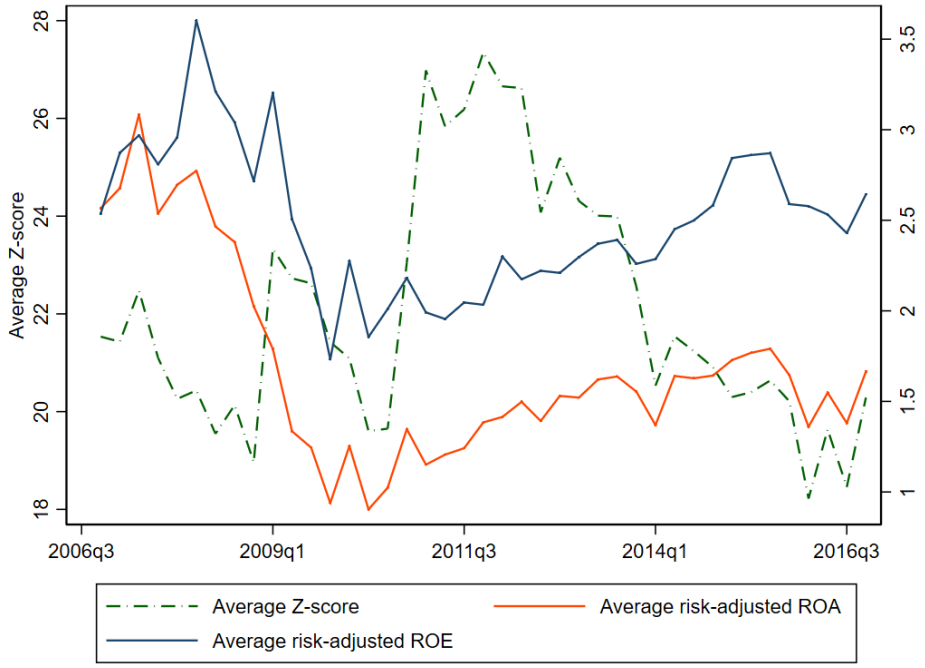


Figure IV.5.: The average quarterly performance of GCC banks over the sample period (2006-2016).

Performance is measured by the quarterly return to assets (ROA) and return to equity (ROE) ratios.

Figure IV.6.: The average quarterly bank stability of GCC banks over the sample period (2006-2016).



Bank sovlency is measured by the quarterly risk-adjusted return on assets (RAROA), risk-adjusted return on equity (RAROE) and Z-score.

Figure IV.7.: The average ratio of each banking products in the GCC Islamic banks over the sample period (2006-2016)

Figure IV.8.: The quarterly ratio of debt-like financing to total assets for each country each country.

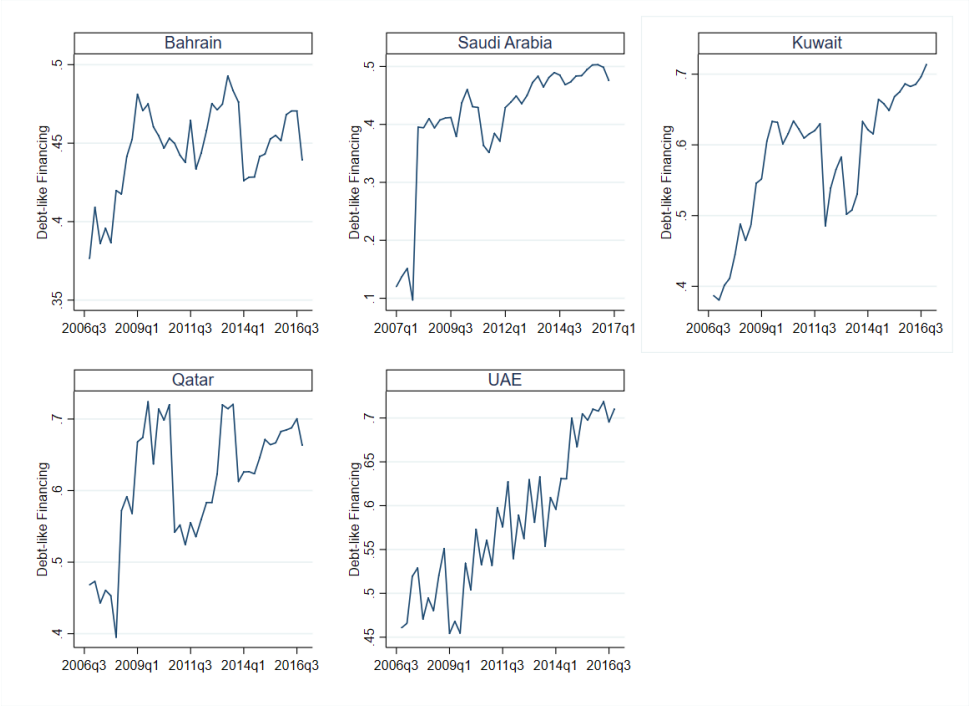


Figure IV.9.: The quarterly ratio of profit-loss-sharing financing to total assets for each country.

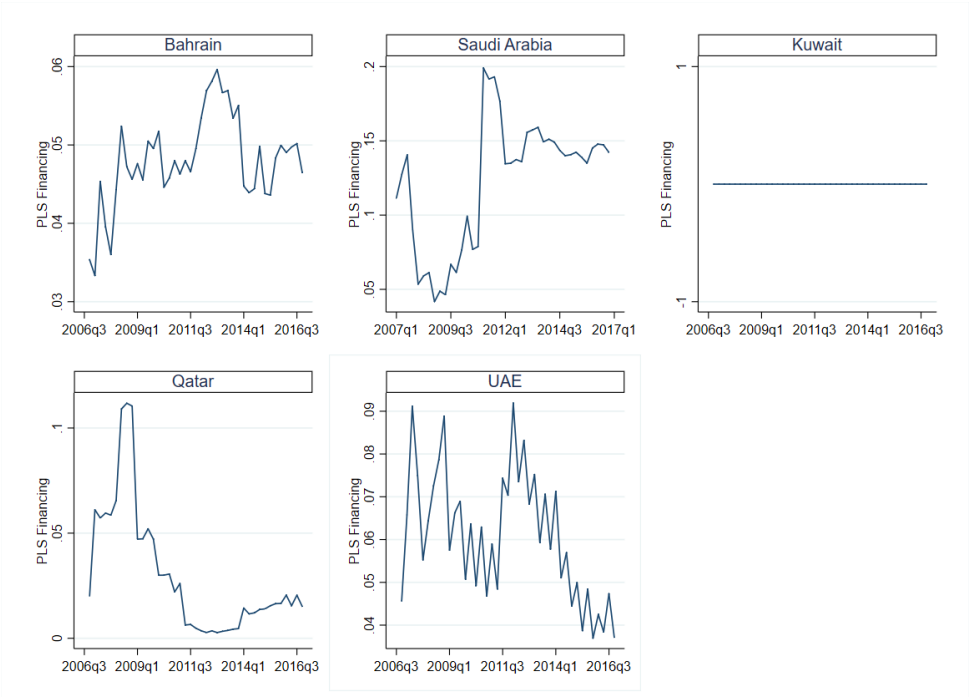


Figure IV.10.: The quarterly ratio of futures contract to total assets for each country each country.

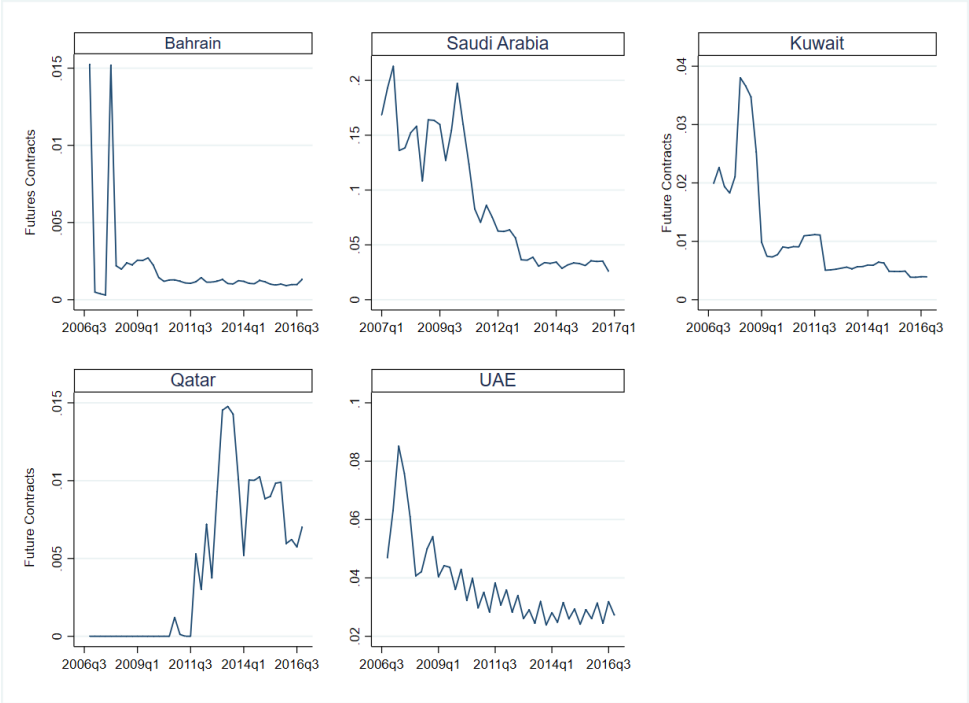


Figure IV.11.: The quarterly ratio of sukuk investments to total assets for each country.

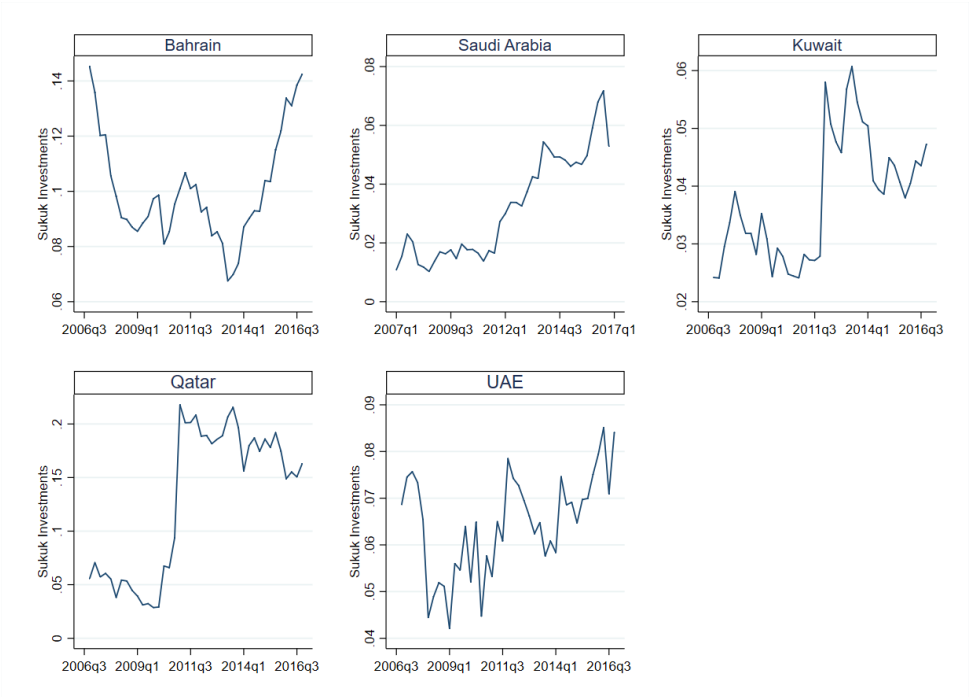


Figure IV.12.: The quarterly ratio of debt-like financing to total assets of every bank in each country.

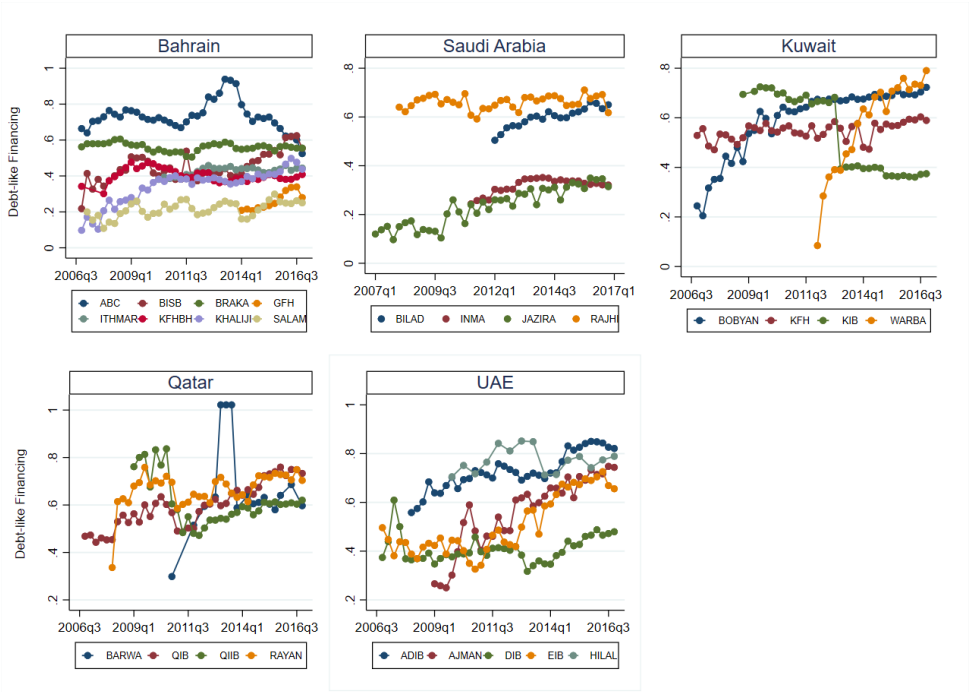


Figure IV.13.: The quarterly ratio of profit-loss-sharing financing to total assets of every bank in each country.

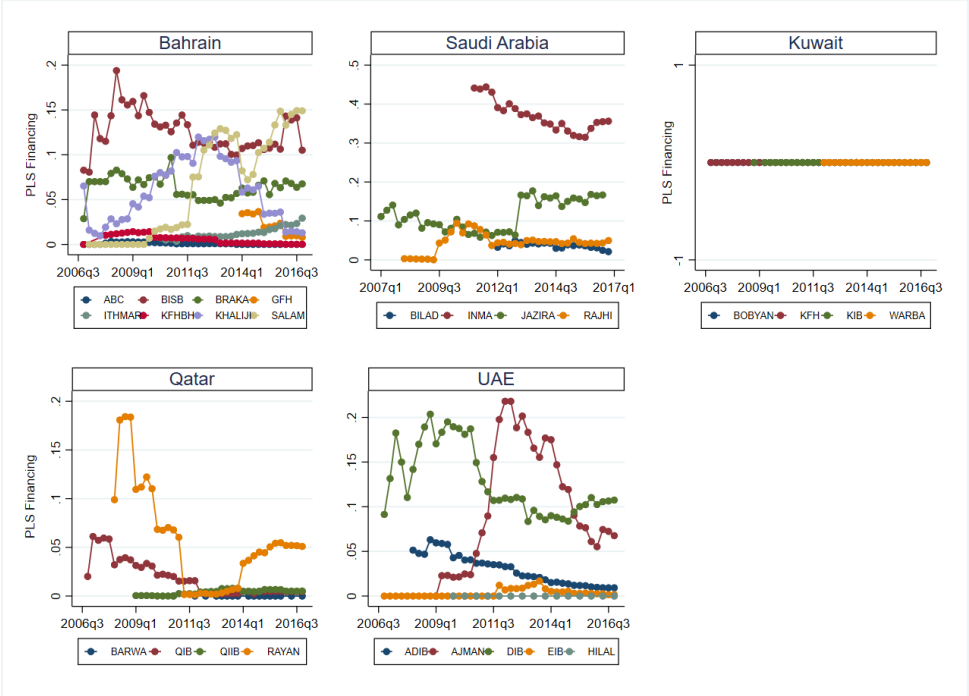


Figure IV.14.: The quarterly ratio of futures contracts financing to total assets of every bank in each country.

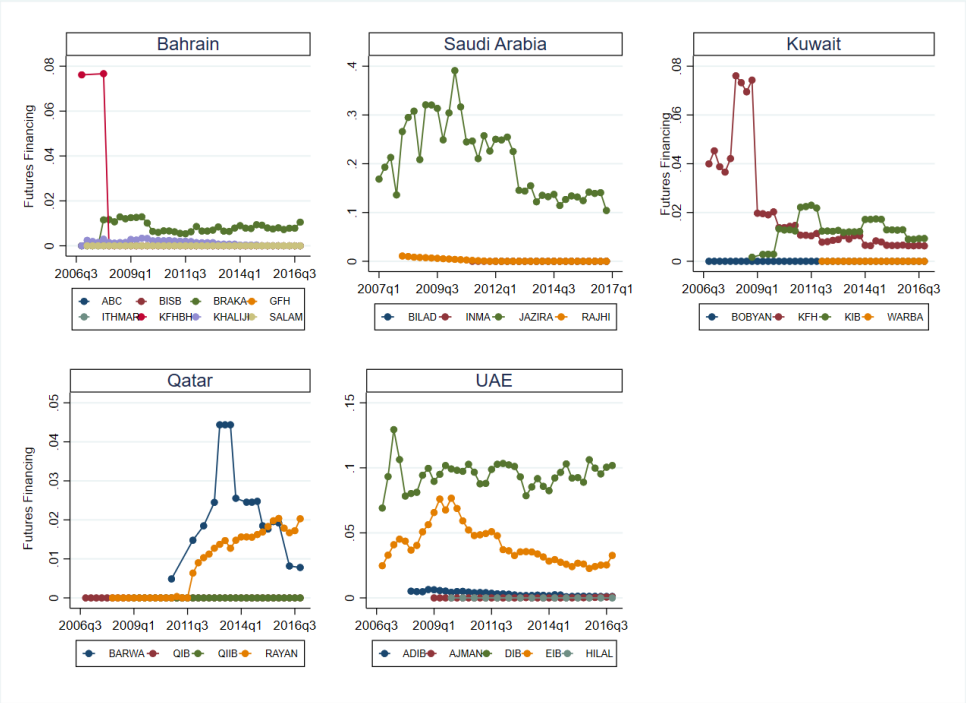


Figure IV.15.: The quarterly ratio of sukuk investments to total assets of every bank in each country.

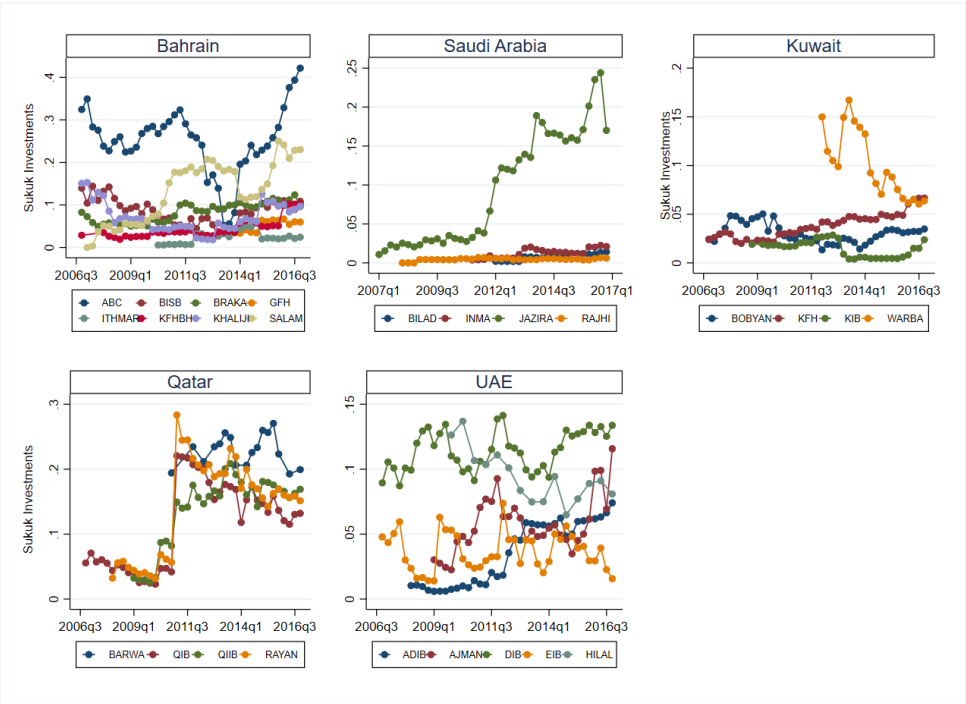


Figure IV.16.: The quarterly proportion of each financing product to total assets in each country.

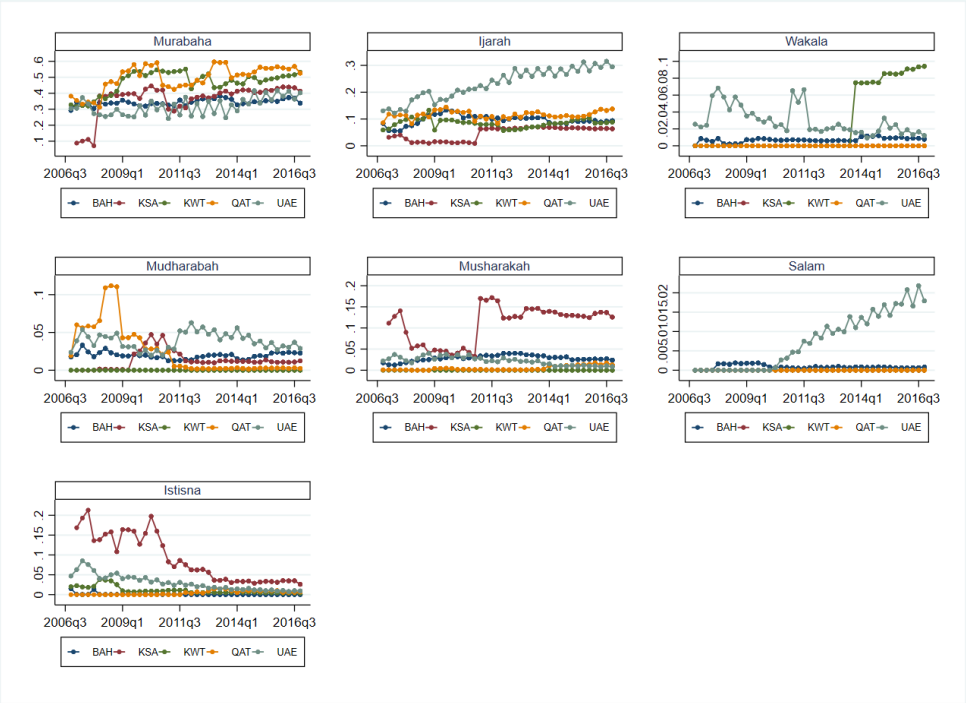


Figure IV.17.: The overall quarterly average product diversification

Figure IV.18.: The quarterly average product diversification in each country

Figure IV.19.: The quarterly average product diversification in each bank in GCC countries measured by the Hirschman-Herfindahl Index

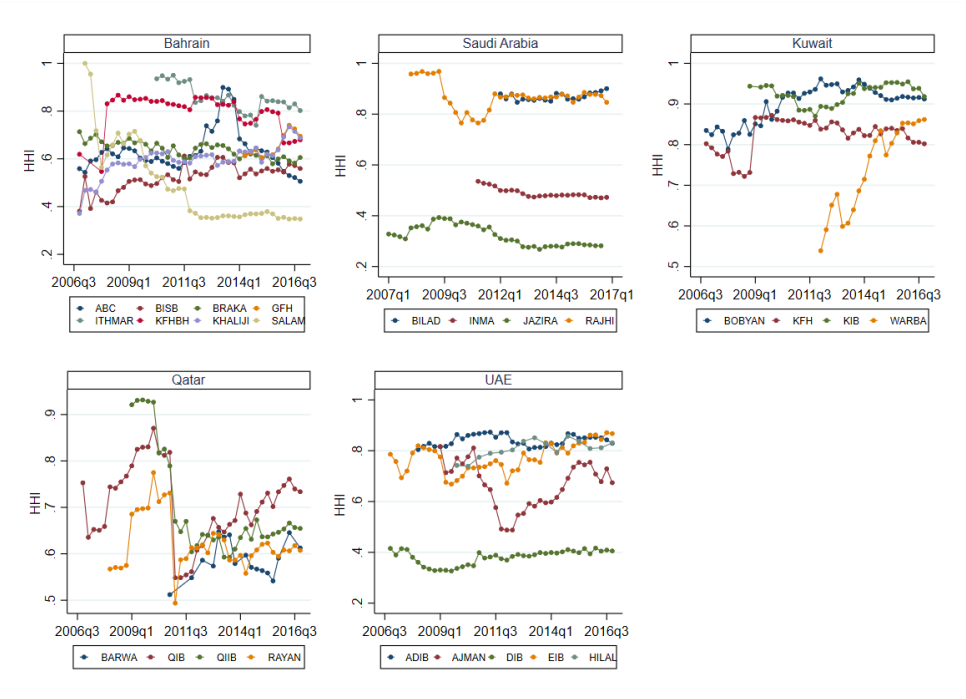


Figure IV.20.: The quarterly average product diversification in each bank in GCC countries measured by the Shannon Entropy

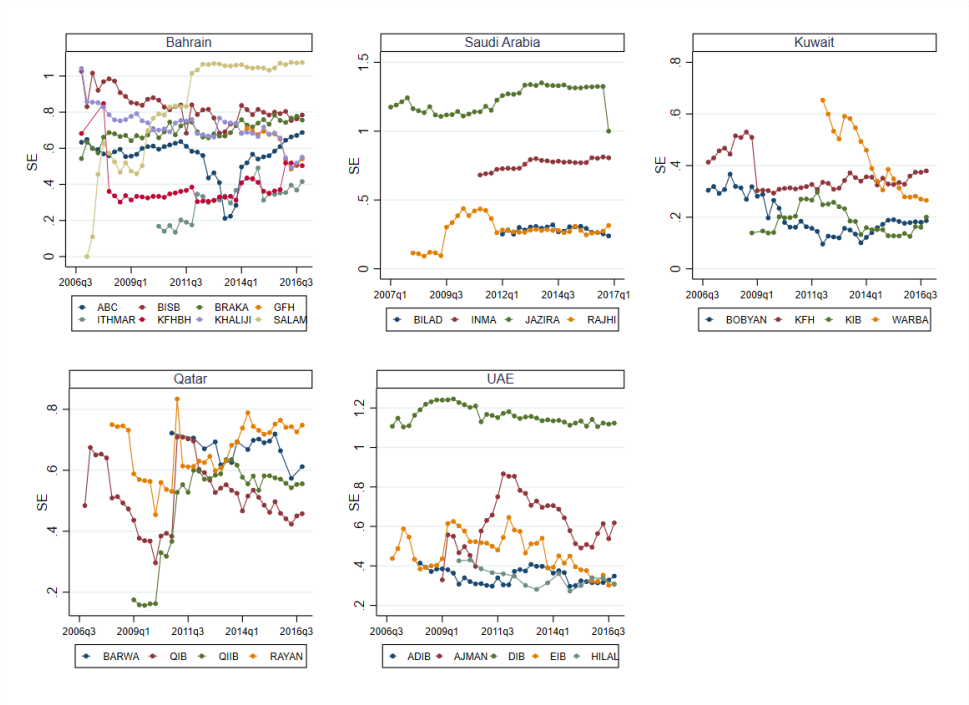
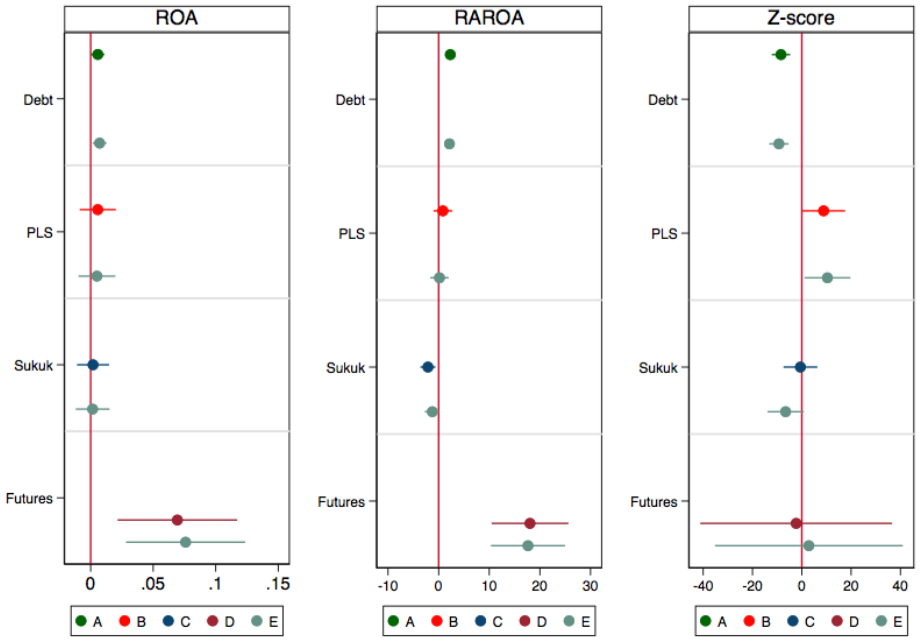
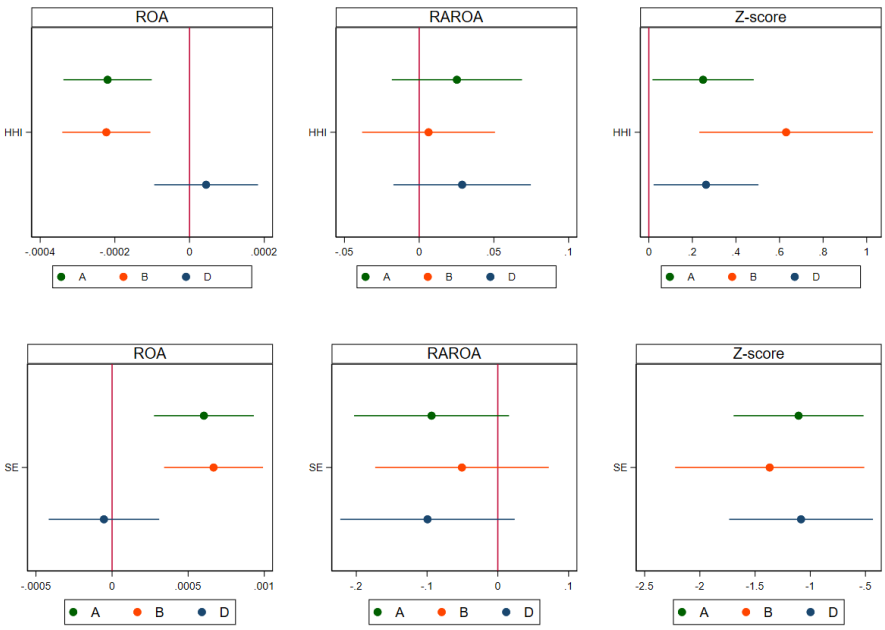


Figure IV.21.: The coefficients obtained from estimations examining the impact of proportion of each Islamic banking product on banks' performance and solvency



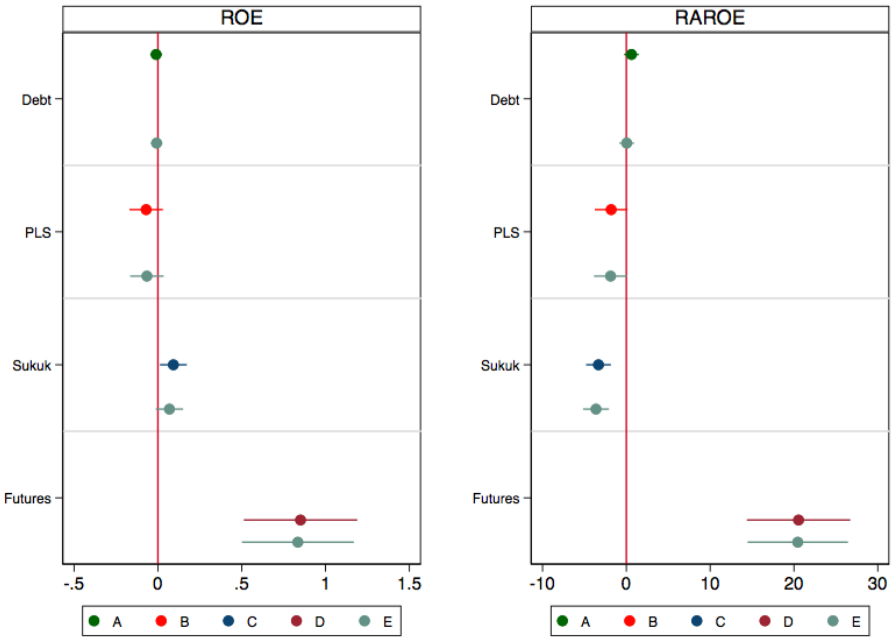
The coefficients obtained from five estimations examining the impact of proportion of each Islamic banking product on banks' performance and solvency (Tables IV.8- IV.10). Performance is measured by ROA, and solvency is measured by risk-adjusted return on assets (RAROA) and Z-score. Letters A-E represent estimations.

Figure IV.22.: Coefficients obtained from estimations examining the impact of Islamic asset portfolio diversification on banks' performance and solvency



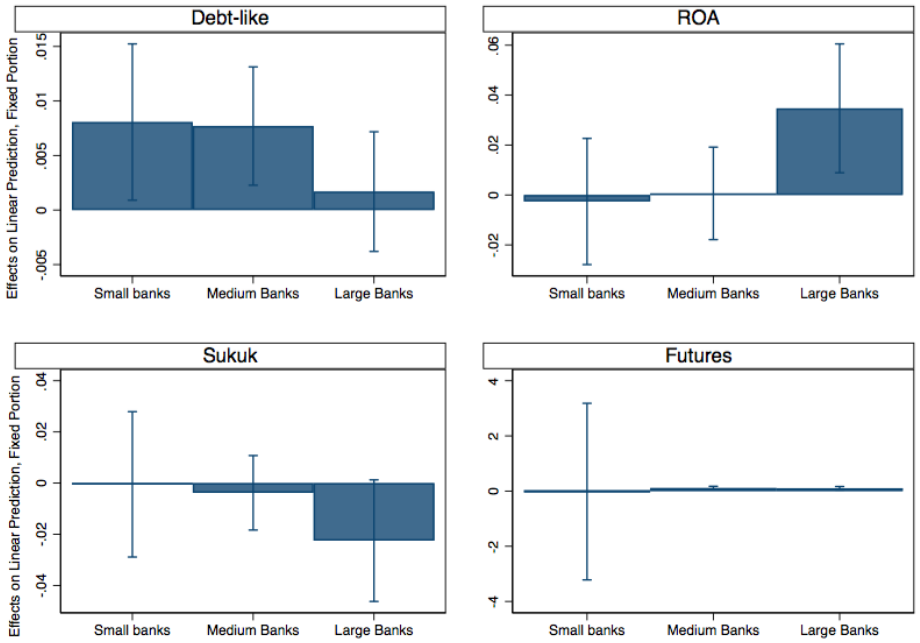
The graph illustrates the coefficients obtained from three estimations examining the impact of Islamic asset portfolio diversification on banks' performance and solvency (Tables IV.12- IV.14). Performance is measured by ROA, and solvency is measured by risk-adjusted return on assets (RAROA) and Z-score. Diversification is measured the Hirschman-Herfindahl Index (HHI) and the Shannon Entropy (SE).

Figure IV.23.: Coefficients obtained from estimations examining the impact of proportion of each Islamic banking product on banks' performance and solvency.



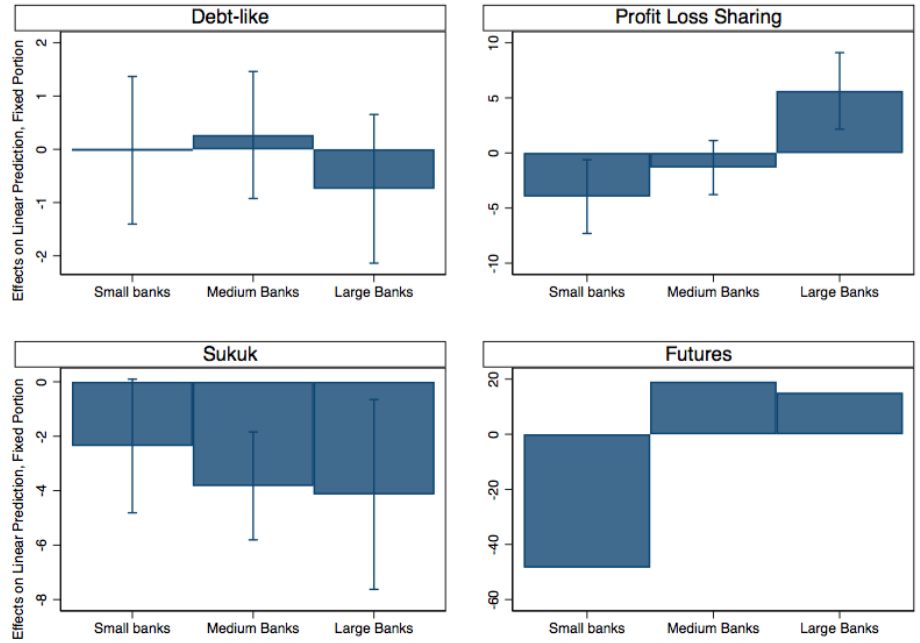
The graph illustrates the coefficients obtained from five estimations examining the impact of proportion of each Islamic banking product on banks' performance and solvency. Performance is measured by ROE, and solvency is measured by risk-adjusted return on assets (RAROE).

Figure IV.24.: Marginal effects of the proportion of each banking product on bank performance with respect to bank size.



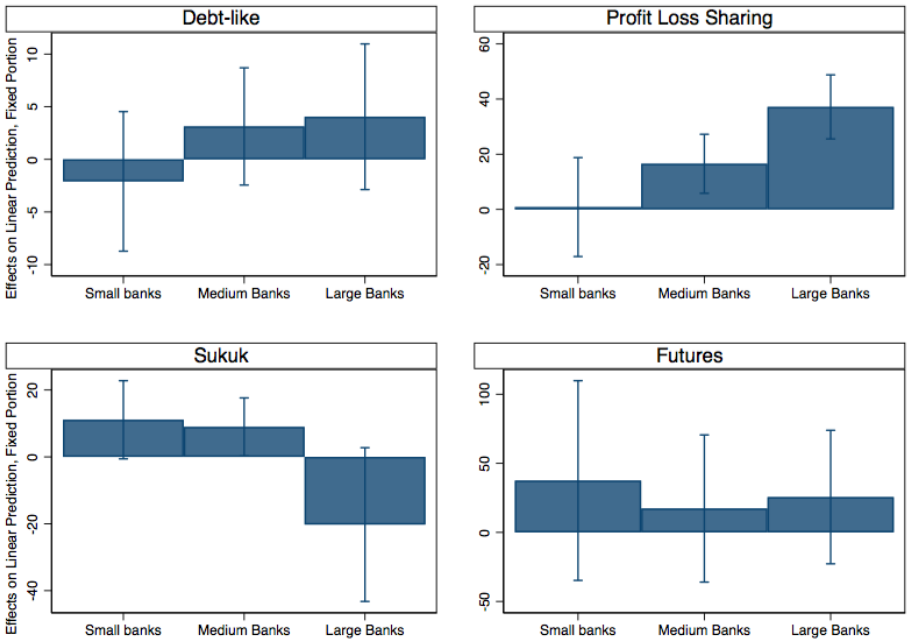
Performance is measured by ROA. Small banks are banks in the 25th percentile of total assets, medium banks are those between the 25th and 75th percentile of total assets. Large banks are those beyond the 75th percentile of total assets.

Figure IV.25.: Marginal effects of the proportion of each banking product on bank solvency with respect to bank size.



Solvency is measured by RROA. Small banks are banks in the 25th percentile of total assets, medium banks are those between the 25th and 75th percentile of total assets. Large banks are those beyond the 75th percentile of total assets.

Figure IV.26.: Marginal effects of the proportion of each banking product on bank solvency with respect to bank size.



Solvency is measured by Z-score. Small banks are banks in the 25th percentile of total assets, medium banks are those between the 25th and 75th percentile of total assets. Large banks are those beyond the 75th percentile of total assets.

Figure IV.27.: Islamic banks average income composition in the GCC Islamic banks.

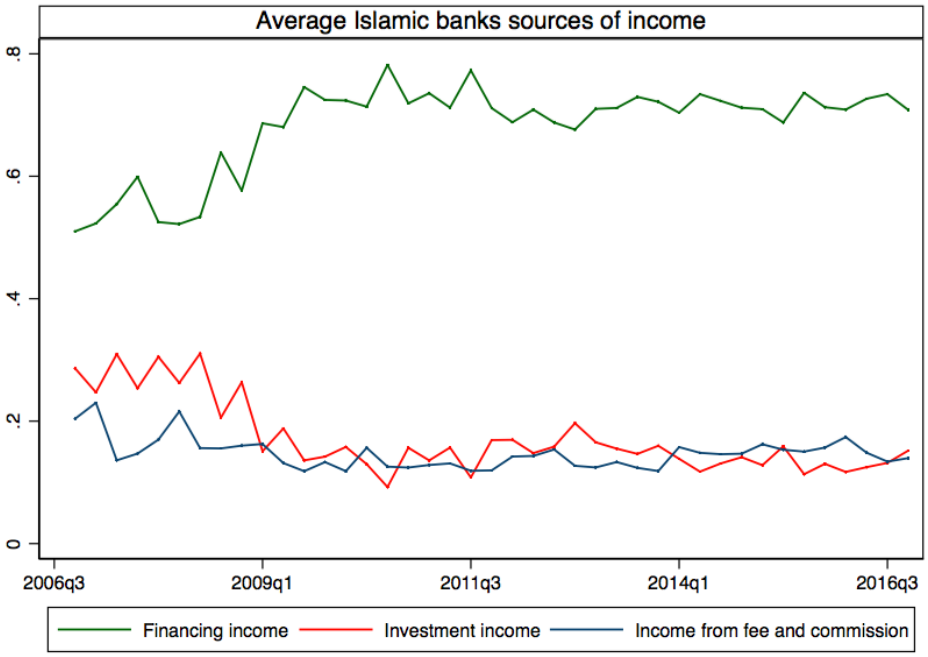
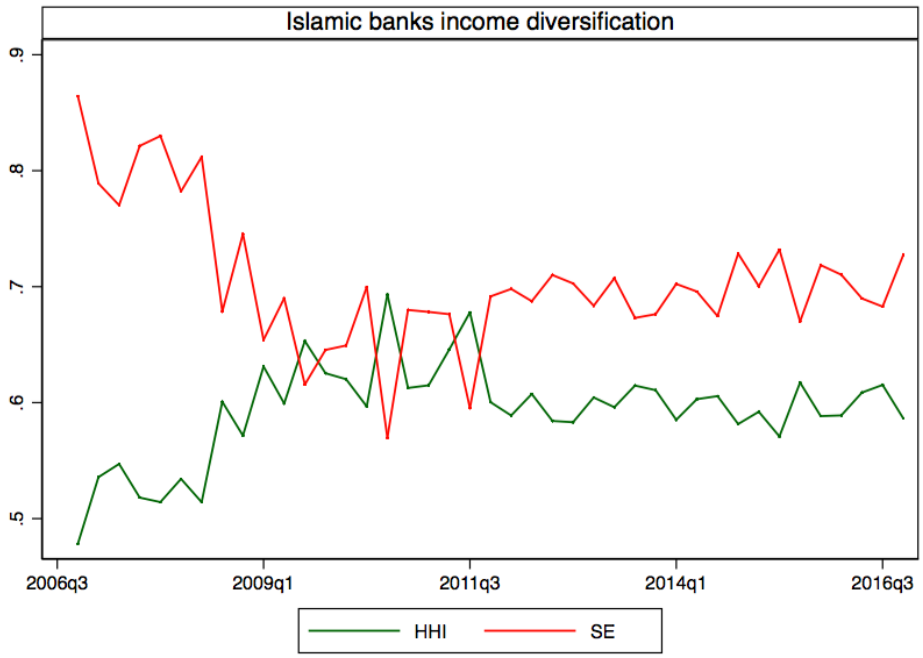


Figure IV.28.: The quarterly average income diversification in the GCC Islamic banks measured by the Hirschman-Herfindahl Index and the Shannon Entropy.



Chapter V.

Concluding Remarks

This thesis is a collection of empirical chapters on contemporary issues in Islamic corporate finance and banking. Chapters II and III are devoted to Islamic investment securities (sukuk). We first investigate the role of firm opacity as an incentive for sukuk issuance. Then, we use corporate capital structure to place sukuk on firms' financial hierarchies, to understand "when" firms choose sukuk given the availability of traditional external funding instruments. In Chapter IV, we use hand-collected data to assess the impact of each product on banks' performance and stability. Also, the chapter performs the first formal evaluation of banks asset portfolios.

The three decades of formal operations provide an adequate environment to empirically verify the descriptive analysis of the Islamic principles. In dual financial economies such as Malaysia, Indonesia and the Middle East (except for Sudan) Islamic banking and finance operate in parallel with the conventional system. In these economies, individuals and firms are not restricted to a single financial approach. In fact, our data show that firms in Malaysia used conventional bonds, shares and sukuk simultaneously during the period from 2006 to 2017. That indicates that transacting via Islamic instruments is not entirely faith-based.

In the first chapter, we estimate the effect of sukuk's informational features on firms' financing decisions by running a multilevel multinomial model. We follow Dahiya et al. (2017) to construct an index to measure firm opacity. Evidence indicates a positive and significant association between firm opacity and sukuk issuances. Hence, by not treating sukuk and bonds as mutually exclusive alternatives, we were able to identify firm opacity as a significant motive to issue sukuk and supports the idea that religion is not the sole incentive. The enhanced understanding of sukuk structures improves Islamic capital markets globalization and reachability. We also highlight the discrepancy between sukuk theoretical structure and the market perception; justifying the inability of Islamic finance to achieve its socio-economic objectives. Finally, We find that firms recognize the differences between Islamic and traditional instruments and between the types of sukuk with respect of information and disclosure requirements.

Given the market's ability to distinguish the differences between conventional and Islamic instruments, in chapter III, we use corporate capital structure to place sukuk on firms' financial hierarchy. Our objective is to understand "when" firms choose sukuk given the availability of traditional external funding instruments. We run a multinomial logistic regression to assess firms' external funding choices in response to restricted financial deficits. Findings suggest that firms prefer to externally raise funds via PLS over conventional bonds and via FIS over

equity. Ranking sukuk on firms' corporate financing hierarchy shows that sukuk are comparable to conventional equity, not only bonds. That enhances comprehension of the behaviour of firms in dual financial system economies and reduces ambiguities and concerns raised by the international economy. Empirically verifying sukuks' debt and equity characteristics improve its pricing mechanisms, risk valuation and credit rating methodology. In that sense, there is a need to redefine Islamic debt and equity and to restructure the regulatory framework taking into consideration the unique structure of Islamic investment securities.

Our analytical approach is key in generating the results of both chapters for several reasons. First, we make no assumptions about the difference between traditional funding instruments and sukuk; in other words, we do not compare sukuk to conventional bonds. Second, we make no assumptions about the different types of sukuk being debt or equity, that is, fixed income sukuk are not assumed to be more correlated to conventional bonds, or that PLS sukuk are similar to shares. However, we breakdown sukuk according to the underlying contract to three categories: fixed-income sukuk, profit-loss sharing sukuk and zero-coupon sukuk. Third, we do not categorize firms as sukuk issuers versus bond issuers as that would eliminate the fact that firms issue sukuk and bonds simultaneously. Firms in our sample issue sukuk, bonds, and equity concurrently. Finally, our financial and accounting data has a quarterly frequency enhancing the quality of the sample. Our results are encouraging and should be validated by expanding the sample to more regions, larger sample size and the application of other corporate capital structure theories specifications.

Allegedly, the debt-equity features of Islamic contracts are as significant in Islamic financial intermediation. In chapter IV, we assess the impact of each product on banks' performance and stability. Also, the chapter performs the first formal evaluation of banks' asset portfolios. We examine the extent to which banking product fulfilment of Sharia aspirations affect Islamic banks' performance and solvency. We classify Islamic banking facilities into four groups: debt-like, PLS, future-like and sukuk. We hand-collect the values of Islamic banking products to examine Islamic banks product mix; otherwise, products are aggregated and categorized as an equivalent to conventional loans. Results are generated by performing mixed models and FGLS estimations.

We report that debt-like products are significantly associated with bank performance, while PLS financing modes affect bank financial stability. Nevertheless, diversifying into more products adversely affects banks' solvency. Results suggest that a rational justification for the dominance of debt-like products is to create balance. Islamic banking is a niche compared to the conventional giant banking system. Hence, its task is to define its operations precisely, familiarize the audience with its model and make a profit while maintaining its Sharia-compliance status. In other words, the dominance of debt-like products is not to deliberately mimic conventional banks' operations. Also, concentration and specialization is a feasible solution for Islamic banks. Thus, the industry can host two types of financial intuitions, each with a specific specialization. Further, this chapter highlights several aspects. First, due to the conceptual differences between Islamic and conventional intermediation, the evaluation approaches for each model are not necessarily the same, and an overlap might lead to severe fallacies. Second, it is important to design

evaluation methodologies that take into consideration the Islamic intermediation model. Finally, that is coupled with the urgent need for databases compatible with Islamic financial reporting to enhance the quality and accuracy of empirical research.

It is plausible that several limitations could have influenced the results obtained in this thesis. First is data quality and availability. For example, some corporate data was not available for all Malaysian firms such as credit ratings. Consequently, we use liquidity measures to measure opacity in Chapter II. Also, in the given time frame, it was not possible to extend samples' period and regions covered in the three essays. That leads us to the second limitation, which is estimation methodologies. We were not able to fully utilities some estimation approaches such as the Dynamic GMM because their accuracy depends on the sample size as in Chapter IV. Finally, we were unable to incorporate the impact of firm Board of Directors and Sharia committees on the decision of issue sukuk in Chapters II and III.

This thesis lays the groundwork for future Islamic corporate finance research into incorporating capital structure theory in empirical and theoretical analyses. It also encourages researchers to undertake comprehensive testing approaches where Islamic securities are considered a purely financial instrument with specific features not directed to people/firms of a particular faith. It also opens doors for responsible socio-economic diversification mechanisms where the link between finance and the real economy is compelling. The thesis also calls for re-evaluating Islamic banks in a manner that recognizes the conceptual intermediation model and types of financing facilities. In conclusion, the synergy between conventional and Islamic literature and practices potentially provides deeper insights into an advantageous balanced application.

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